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Editor: J. R. HUDSON, B.Sc., M.R.C.V.S.
Assistant Editor: R. H. J. McQUEEN, B.Sc., Dip.Ed.

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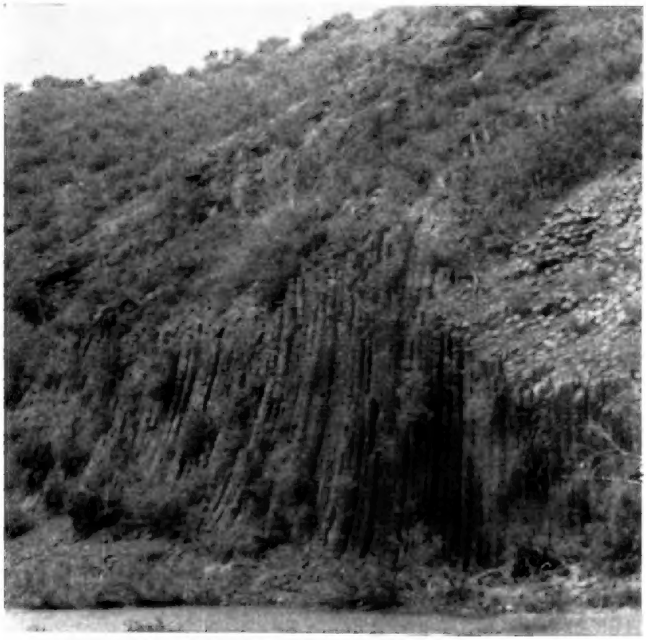

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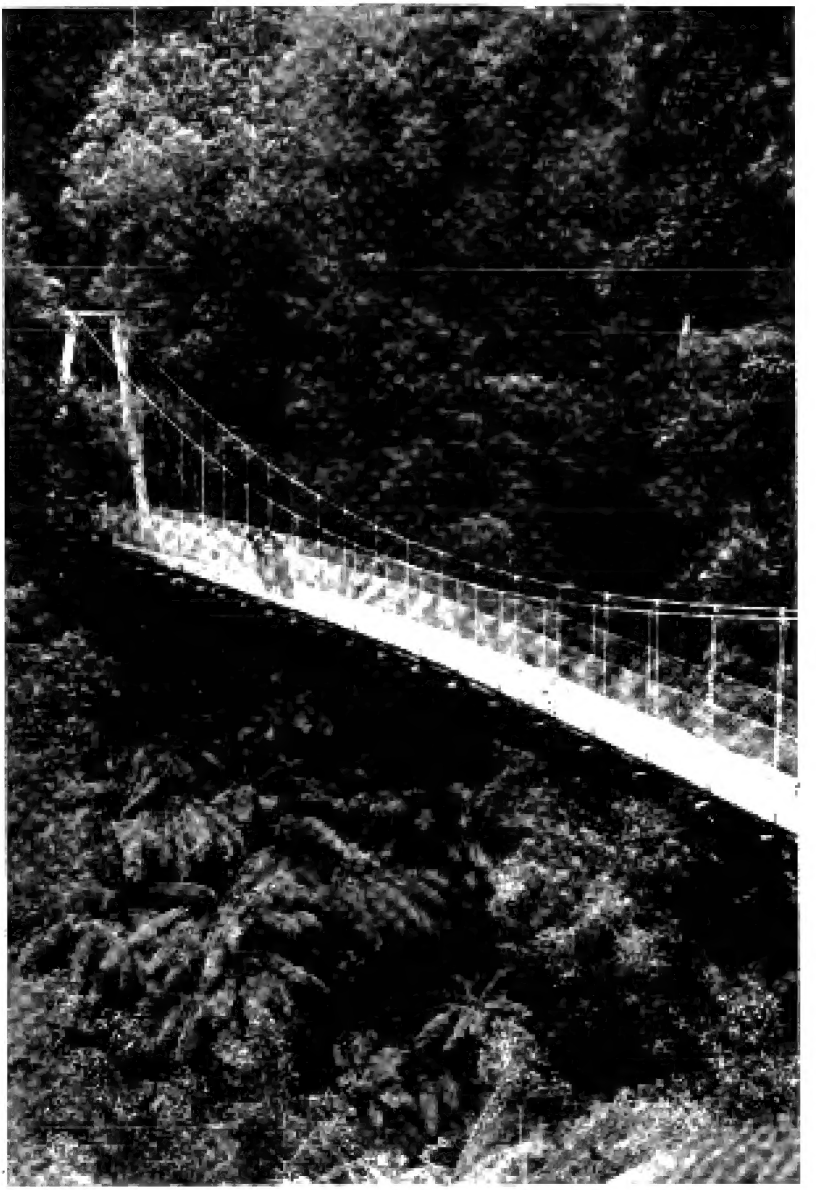

Photo: P. C. Morrison

Suspension Bridge, Bulga National Park, South Gippsland.

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View of the Sydenham Organ Pipes. The Trustee of the A. E. Green Estate has donated this natural feature and an area of over 40 acres to the people of Victoria for a National Park. Block kindly lent by the National Parks Association.

Bird Life at the M.M.B.W. Farm, Werribee

By FRANCES N. SEARLE

The Metropolitan Farm at Werribee is a sanctuary for wildlife, and birds are particularly plentiful. It would be difficult to find another place only 25 miles from Melbourne where there is such a variety of bird life and where it is so very easy to see them. You need only drive or cycle along the roads and you will see a hawk or a kestrel over the paddocks, a sleepy owl or two perched on a tree, or a blue wren balancing on a fence wire. But perhaps the birds that create the greatest interest are those which inhabit the marshlands and lagoons.

Go along any road near the freshly irrigated grasslands in summer and you will see hundreds of ibises—both the white and the straw-necked species. They poke their long sickle-like beaks into the roots of the grasses seeking grubs and other insects. Very common in these areas are White-faced Herons—erroneously called "blue cranes". These are graceful birds with lovely grey-blue plumage, and they step very elegantly on their long legs through the shallow water. When disturbed they give a loud croaking note and rise with a slow leisurely flight.

The Cape Barren Goose is a rare visitor, but you may be fortunate enough to see one on the swampy grasslands. You may also see a Brown Bittern among the reeds and swampy

Black Swans

Photo: C. E. Bryant. Reproduced by courtesy M.M.B.W. Officers' Journal.

Golden Whistler, male at nest.

Photo: C. E. Bryant. Reproduced by courtesy M.M.B.W. Officers' Journal.

ponds or at Cherry Creek. This is quite a big bird of a streaked brownish colour and, when startled, it stands perfectly still, seemingly trying to disguise itself as a stick.

From the lonely roads through the lagoons you will see numbers of wild duck—Mountain Duck with their beautiful colours, Black Duck, Teal, and others. In the more inaccessible parts of the lagoons nesting boxes have been placed by bird-watchers who put bands on the legs of the young ducks so as to observe their migratory movements. Ducks banded at the farm have been found as far north as Townsville in Queensland. Also on the lagoons are Coots, which are expert swimmers and divers, and Swamp-hens. Further out on the clear open water are birds of the grebe family, probably better known as dabchicks. These dive quickly and, just as you have decided they must have drowned, they suddenly pop up again some distance from where they disappeared.

As the farm has a frontage of about 13 miles to Port Phillip Bay, there are many birds to be seen along the foreshore. There is little sand here; just piles of

broken shell which change with every tide. On the shelly beach from November to January you may find the eggs of the Fairy Tern. But you will need sharp eyes. There is no nest and it is difficult to distinguish the pair of speckled eggs from their shelly surroundings. Another beach resident is the Red-capped Dotterel. Sometimes Black Swans may be seen in hundreds along the shore, searching among the seaweeds for succulent morsels.

Around the mouth of Little River are pelicans, usually fishing in the shallow water, while further out to sea, numbers of Cormorants or "black shags" are diving for fish on the shallow reefs.

There are miles and miles of plantations at the farm. Some of these areas contain quite big trees and shrubs, while others have a close growth of bushes. These have been planted for wind-breaks but the birds have taken them over as their own. You cannot miss the rosellas and other parrots as they fly screeching through the trees, and you will hear the mournful six-note trill of the Fan-tailed Cuckoo. Among the smaller birds are blue wrens, honeyeaters, Golden Whistlers with their brilliant yellow breasts and black collars and throats, and parties of Little Thornbills. The Yellow-tailed Thornbill builds a most intriguing nest—a domed structure with the entrance near the top. But amongst all these peaceful birds of the plantations there is an outlaw — the Goshawk — which preys on small birds and nestlings.

Where the effluent channels run under the roads you can

Eastern Swamp-hen.

Photo: C. E. Bryant. Reproduced by courtesy M.M.B.W. Officers' Journal.

Photo: C. G. Bryant. Courtesy M.M.B.W. Officers' Journal

Red-capped Dotterel.

often see the bottle-shaped nests of the Fairy Martin or "bottle swallow". These nests, in rows or clusters, are made of hundreds of small mud pellets plastered together to form strange bottle shapes that project from the wall of the culvert. The same nests are occupied each season, repairs being made when necessary. Fairy Martins are usually migratory but here, where the weather is mild, they can be seen all the year round.

More than 180 different species of birds have been recorded at the farm, and additions are made to the list every few years. In 1962 an exciting addition was the Red-necked Phalarope; it had never been observed in Australia before. Also in 1962 the Oriental Pratincole, another migrant species from Asia, appeared on the farm and this was a first record for Victoria. As well as these temporary visitors there are other birds, formerly rare in the locality, that are establishing themselves and becoming more plentiful. For instance, several Red-kneed Dotterels (once considered rare south of the Divide) have been nesting at the farm and are probably on the increase. There are interesting discoveries here for the very keen observer as well as for the more casual one.

There are several public roads through the farm, and a written permit may be obtained from the M.M.B.W. to enter some of the other roads.

A Tribute to the Naturalist, Amalie Dietrich

By G. MULAC-TEICHMANN

It is just over one hundred years since the young German naturalist, Amalie Dietrich, landed in Australia. A hundred and one years have passed since the year 1863 and a lot of history has been enacted; many of the events of that one hundred and one years have been forgotten, but one remains outstanding and unforgettable: the story of the young woman scientist who left one part of the world in order to help discover another, and a far distant, part.

The little figure of Amalie's daughter, Charitas, vanished into the mist lying over the old German city of Hamburg, as the sailing ship *La Rochelle* left the harbour on May 15, 1863. The ship's destination was Australia, and Amalie Dietrich was travelling to Australia in order to enrich the private museum of the Hamburg merchant, J. C. Godeffroy, in *Alt Wandrahm* with new botanical finds from the new country.

It was the first time that a woman had undertaken such a task, but Amalie was well suited for her mission.

Equipped with her scientific books and tools, she made herself at home on the ship. In the three months of the journey she diligently studied the English language, without which, during the ten years which she was to spend in Australia, any movement would have been impossible.

The greater part of her fellow passengers on the *La Rochelle* were there for another reason—they wished to seek for gold.

For three months the seas held the destiny of the ship and its inhabitants in their power. When a storm suddenly blew up, Amalie prayed not only for safety but also for the fulfilment of her life's work. Then, under a favourable star, the ship made her way around the Cape of Good Hope and into the Indian Ocean.

Amalie wrote often to her young daughter, Charitas, whom she had had to leave behind with strangers. She would write later to her dilatory husband, when she arrived at her destination in Australia. She had taken with her a small text-book on the algae to be found in the southern seas and during the long voyage she studied this also. The everlasting scholar!

At long last land was sighted, first islands, then the mainland, but the ship had still to sail around half a continent before Amalie's goal was reached.

In August 1863 the east coast of Australia was sighted, then the ship sailed up the coast to Brisbane, Queensland.

Brisbane, on Moreton Bay and twenty miles up the Brisbane River, was only forty years old

at that time. The mysterious land of Amalie's exile, six times larger than her homeland, Saxony, lay open before her eager naturalist's eyes, and she lost no time in seizing her opportunity.

At once she started on her work. She did not accept an invitation to go to an hotel, but looked around for cheaper quarters until she could find a home with other Europeans. With the help of one of Godeffroy's agents she rented a small house near the Brisbane River, built on stilts to counter the depredations of white ants. Two Chinese boys brought her few belongings from the ship to her new home — and what were those belongings? Specimen jars, spirits to preserve her finds, books, equipment for her scientific collections, and a few cooking utensils which she had bought in Brisbane.

"Now, at last I can start on my work," she wrote to Charitas on August 20, 1863.

A Chinaman demanded money from her for water, but she would not give it to him. She drank no tea until she found a waterhole near her house; she wanted to rely on her own resources right from the start and to learn to look after herself in the bush, in spite of its strangeness.

With a little flour, salt, tea and matches in a knapsack, she left her house on her first collecting trip and had to carefully note the landmarks so that she could find her way home again. She wore a big straw hat with a veil to protect her from the sun and the persistent mosquitoes. In her letters she said that a feeling of fear came over her on this, her first excursion into the primeval forest, but the zeal of the dedicated naturalist carried her through.

As soon as she found water she made small, flat, damper cakes from flour, salt and water, and baked them in the hot ashes of her fire; this sort of food was to be her main diet from then on during most of the next ten years. She boiled her billy and had her first meal in the Australian bush.

The plants she found were all completely new to her and soon her collecting container was full. To preserve the insects she collected, she had taken glass jars and methylated spirits. Back in her house, she pressed the flowers and plants and prepared her collection for sending back to her sponsor, the merchant Godeffroy in Hamburg.

"I feel as if Mr Godeffroy has presented me with this vast continent," she wrote to her daughter. In the first eight months she sent off twelve parcels of specimens to Hamburg.

Later, she went to Rockhampton and here misfortune nearly overtook her. On one of her expeditions a beautiful blue waterlily growing in a swamp was an irresistible lure, but she soon found, to her horror, that she was trapped in the quicksand. Whenever she tried to move she sank deeper into the mud, and she could only stand still. All that she could hear was a kookaburra laughing in a nearby tree and frogs croaking in the swamp around her.

Fortunately however, it was a time of full moon and nearby some aborigines were gathering

for a corroboree; they heard her cries for help and came in a dug-out canoe to save her from the swamp.

The results of this horrifying experience came later, when Amalie became ill with malaria; she developed a high fever and was unable to work for several months. She treated herself with doses of quinine from her medicine chest and eventually she recovered from the bout of malaria.

Soon after this another near-disaster occurred. Her house, with some of her precious collections inside it, was burned down. She did not believe that the aborigines were the culprits; in a letter to her daughter she wrote "They (the aborigines) are not bad intentionally, but only uneducated, like children. I cannot say anything bad about them, as they saved my life not long ago".

While in Rockhampton, Amalie had news of the death of her husband, to whom she owed her scientific training in botany but with whom she had not been particularly happy. She had tried to bring him to her side, but he could not make the decision, and a last try for reconciliation had failed. At home in Germany, after Amalie went to Australia, her husband had read with interest about his wife's work, particularly as many of her finds were named after his family name — Dietrich — a family of well-known botanists. Among the plants which she sent home were *Acacia dietrichiana* and *Bonumia dietrichiana*, and among the insects were *Nortonia amaliae* and *Odynerus dietrichianus*; these were duly catalogued in the museum by the curator, Kustos Schmeltz.

Although Amalie had been trained in botany only, her interests soon spread to entomology and ethnology also, and in 1867 she was made a member of the Society for Entomology in Stettin, Germany, and won a gold medal for a collection of fifty Australian woods in an exhibition there.

At that time, Amalie was living and working at Mackay. She had arrived there the year before by steamship. "I am near Port Mackay," she wrote. "In the settlement where I live there are some Europeans, who are mostly concerned with the cultivation of sugarcane. They employ natives as cane-cutters, because the heat in the plantations would be unbearable for Europeans. The natives are called Kanakas and are well-built and powerful men. One thing you don't find here is gold! That is why there are no gold-hungry Europeans over-running the country."

From Mackay, Amalie made a trip with a bullock team to Lake Elphinstone, where she had to wait for a year until the bullock driver was returning with his team. She lived with a family named Hesse and spent her time as busily as ever. She learnt more about the language of the aborigines, which at first was quite incomprehensible to her. There she also watched a corroboree of the aborigines from behind a tree and wrote in detail about this event to her daughter. It was similar to a corroboree she had seen in Rockhampton.

Amalie Dietrich

From Mackay she moved on to Bowen and in one of her letters to Charitas, who was then in London, she gave her young daughter some typical advice. "That big city! Don't you feel that you must use all your efforts to profit from that rich experience? You must leave your destiny, your future, to God and Time. Don't let yourself be beaten by anybody, but be true to your ideals and faithful to your work." These were the very qualities which Amalie herself could call her own, so generously.

She also wrote about the assistance she had received from a German settler, who had been living in the country for a long time and who could communicate with the aborigines. It was through him that Amalie obtained some of the natives' utensils and weapons, in exchange for flour and tobacco.

Soon afterwards, she went from Bowen to Port Denison, and visited the Holbrook Islands by canoe. She was enchanted by the colourful world of the Pacific marine life. She caught a swordfish and later sent the fish, with the "sword" in a separate container, to Hamburg, only regretting that she could not include the beautiful surroundings!

In April 1871 Amalie Dietrich went to Melbourne, where she met the well-known botanist, Baron Ferdinand von Mueller.

After a short stay in Melbourne she returned to Queensland and left in February 1872 for a trip to Tonga, where she met the King of Tongatabu, known as "George the First". As a gesture of friendship the King presented her with his photograph. The Queen presented her with a powder-box made of a fruit like a big poppy-head.

Ten years after she came to Australia, Amalie returned home to Germany, travelling in the ship *Susanna Godeffroy* and making the voyage around Cape Horn. Her daughter, now grown-up, was awaiting her on the wharf and it was a pathetic fact that the girl could hardly recognize in the old, bent woman, poorly dressed and with worn canvas shoes on her feet, the young mother whom she had last seen ten years before. Her mother had been called a heroine by scientists and by the Godeffroys. Was this the picture of a heroine? Amalie burst into tears as she took her daughter into her arms; never would she leave her again!

Destiny however, decreed

otherwise. Charitas was engaged to be married to a young pastor who worked on the borders of Denmark. Amalie decided that she would not go to live with the young couple. Her road led her to the *Alt Wandrahm*, where old Mr Godeffroy welcomed her home; in recognition of her faithful work for him, he had arranged for a flat for Amalie to live where she would be able to be near her beloved collections.

Amalie also visited her hometown, Siebenlehn, in Saxony, and took with her, as a gift to the townspeople, duplicates of her collections of Australian ferns and mosses. She visited the *Lower Town* and went for walks through the Zellwald, the forest where her husband had taught her botany so many years before. Her collections were shown at the Town Hall in Siebenlehn —on what difficult roads they had led her, right around the world!

A March wind was enough to break the old tree. Amalie became very ill and in her feverish, fantastic dreams she went once more through the places of her wanderings. On March 9, 1891, she closed her eyes for ever. Her grave at the cemetery of the old town of Rendsburg on the Danish border is today overgrown with the mosses she had once loved so well. A simple stone holds her name. The words of her daughter about her live for ever: "Better a hard life than an empty one".

Some of the duplicates of her collections were sent back to Baron Ferdinand von Mueller in Melbourne and are today in the National Herbarium in the Royal Botanic Gardens of Melbourne.

With respect I remembered the hardships and the faithful and dedicated work of the naturalist who was one of the first white women in the North of Queensland. Even in the much easier conditions of today, there are not many exploits that can be compared with the pioneer work of Amalie Dietrich. Those who read of the life and work of this courageous scientist will learn patience, determination and devotion to duty.

Could Sow-thistles be Native?

By J. H. Willis

Professor Sir John Cleland, in an interesting paper "Are the Sow-thistles indigenous to Australia?" [*S. Aust. Nat. 23*: 12-13 (June 1946)], surveyed the available evidence. In his opinion it suggested that a form of *Sonchus asper* (L.) Hill, viz. variety *gracilis*, was truly indigenous to our continent. It is now widely agreed that the perennial Dune Sow-thistle, *S. megalocarpus* (Hook. f.) J. M. Black, is endemic along the coasts of southern Australia, just as the related *S. littoralis* (Kirk) Allan is in New Zealand; but most botanists still regard the other two species occurring here (*S. oleraceus* L. and *S. asper*) as introduced aliens—see J. M. Black's treatment in *Flora S. Aust.* ed. 2, p 943 (1957).

Cleland mentions that in May 1844 G. F. Angas had seen black-soil swamps near Rivoli Bay (S.A.) producing "luxuriant sow-thistles and other rank vegetation", and that 100 years later he himself observed "luxuriant examples of *Sonchus asper*" in the same area.

As far as Western Australia is concerned, Dr Ludwig Preiss collected both *S. asper and S. oleraceus* near Fremantle during the month Dec. 1838-Jan. 1839 (his Nos. 116 and 117 respectively). But, even earlier than this, there is a reference to Sow-thistles by William Milligan in "Some account of the New Colony of Western Australia, more especially of the Swan River District, the Natives, Settlers, Climate, Soil, Productions, etc," published in the *Madras Journal of Literature and Science 6*: 304-336 (Oct. 1837). Dr Milligan, as Assistant Surgeon with H. M. 63rd. Regiment, took part in the founding of Swan River Colony during June 1829, and he remained there at least until after Dec. 1833. Like his famous prototype in the east, Surgeon-General John White of Port Jackson, Milligan was no mean naturalist; he made detailed observations on the meteorology of the young colony, the aborigines and their customs, and, to a lesser degree, upon the flora and fauna. On page 306 of his report are the words:

> Of the indigenous edible plants which were found most useful to the early settler, are the sow-thistle *(Sonchus)* . . . . . .

So Milligan considered *Sonchus* to be a native plant there at the beginning of the 1830's. True, it is conceivable that species so effectively adapted as *S. oleraceus* and *S. asper* for dispersal and rapid propagation in varying soils, might both have become quite widespread around settlements within two or three seasons of their fortuitous introduction; but the tantalizing question lingers — *were* they here before the first settlers?

G. Bentham, in *Flora Australiensis 3*: 680 (1866), states that *S. oleraceus*—with which he included *S. asper* as a variety—is "perhaps truly indigenous". On page 678 he makes a similar comment under *Picris hieracioides* L., which species is given the benefit of the doubt in H. H. Allan's *Flora of New Zealand 1* (Indigenous Tracheophyta): 759 1961. This Old World biennial certainly occurs in many remote mountain habitats of eastern Victoria, giving every appearance of an indigenous plant, while I have found it sparingly on isolated islands of the Recherche Archipelago, W.A., where few weeds are in evidence. Australia is extraordinarily weak in native representatives of the vast tribe *Cichorieae* (in *Compositeae*); for, apart from a dubious acceptance of *Picris* and the two annual *Sonchus* species, our only others are Dune Sow-thistle (*S. megalocarpus*), Japanese Hawk's-beard or "Oni-tabirako" (*Crepis japonica*) in northern N.S.W. and Queensland, and the Yam Daisy (*Microseris lanceolata*) of such wide occurrence over temperate Australia.

It is interesting that Dr Milligan should have placed sow-thistle at the head of his enumeration of native plants that were "most useful" to the pioneer colonists. The writer has often eaten tender shoots of *Sonchus oleraceus* as a cooked green; it has an agreeable flavour, quite up to the standard of garden spinach and certainly superior to that of New Zealand spinach. Yet, how few cooks make any use of this ubiquitous and extremely abundant weed!

Wallowa, *Acacia calamifolia*, and Dwarf Nealie, *A. wilhelmiana**

By Jean Galbraith

These two Mallee wattles have much in common besides their habitat, but the musically named Wallowa is larger in every way than Dwarf Nealie. Wallowa sometimes grows to fifteen feet or more, while the other species is, in my experience, rarely as much as four feet high. The globular flower-heads of Wallowa are larger, and its phyllodes normally much longer. Wallowa is never sticky; Dwarf Nealie is always more or less so.

Both shrubs produce deep yellow flowers in September, and both have narrow foliage—sometimes so narrow that it is said to be terete (i.e. cylindrical—but in neither species is it ever quite cylindrical. Even when so narrow as to appear needle-like, the phyllodes are distinctly flattened.

Wallowa has phyllodes usually two to four inches long, each with a slender bent point, and its rich yellow, stalked flower-heads spring from the leaf-bases, one or several together. Later, the narrow, bright brown pods develop, nearly straight but with wavy edges. These are anything from two to six inches long.

Though it can be tall, Wallowa is often dwarfed to three or four feet high. It grows luxuriantly at the foot of Mount Arapiles, and I shall never forget its bright gold, stretching in park-like vistas through the Manna Gums, with the short spring grass below.

Dwarf Nealie usually grows in desert country, and its narrow sticky phyllodes are rarely more than an inch long, almost always with a slight curve out and upward at the base, then out and downward at the blunt apex, making a long "S" shape. The same shape is seen in the phyllodes of Rough Wattle *(A. aspera)* but that has hairy foliage and pods, and the leaves are usually broader.

Like Wallowa, Dwarf Nealie has slender pods, but unlike those of Wallowa, its pods are usually much curled.

*On the authority of Mr A. B. Court of the National Herbarium, Melbourne, the name *A. wilhelmiana* is used for the Dwarf Nealie, instead of *A. bynocana*.

Wallowa—*A. calamifolia*.
Photo: N. A. Wakefield

Records of New Shelters in the Black Range

By A. MASSOLA

Rock shelters bearing aboriginal paintings are no longer rare in the western Grampians. The opening up of the country, the making of fire-breaks, and the pushing through of new tracks into the more inaccessible parts continually bring new examples to light.

Nevertheless, the feeling experienced in being one of the first white men to gaze upon a newly discovered symbol of the religious beliefs of the former occupants of this country is real and lasting. No matter how many new paintings are found this sensation will never be lost. The presence of the Unknown is felt; the very air vibrates with awe, and the stillness and silence of the place proclaims the reverence due to its forgotten cult heroes.

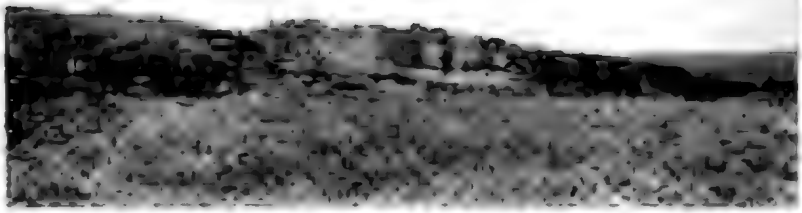
The finding of a new shelter is a fateful moment even for the materialistic and the prosaic, as it could yield a clue to the dating and the understanding of earlier finds.

When a painting has been discovered in a new locality, thorough searching generally produces others within a reasonable distance. However, this searching is extremely difficult, as all those who have "walked" in the western Grampians well know. It is almost as if the aborigines went out of their way to find the roughest, wildest, and loneliest spots on which to paint their pictures. This impression is accentuated by the fact that, as well as the rugged, stony, and mountainous terrain, one has also to contend with the almost impenetrable thickets of undergrowth, the exposed roots, the trees and thorny bushes, and the sword-like grass growing in profusion in these localities: it is truly "blackfellows' country".

To the natives however, the Grampians presented a very different appearance. The tangled mass of vegetation which now so impedes progress did not exist then, and grassy slopes, intersected by open timber country, reached to the very base of the crags. This was because every so often the natives set fire to the bush in order to facilitate hunting. The frequent burning-off would cause verdant and tender grasses to grow, which would attract the game the aborigines fed upon.

The practice of burning-off was continued by the early settlers and they were thus able to graze their sheep in what is now impossible country.

The latest locality to receive attention from that tireless group of field naturalists who have been responsible for so many earlier discoveries, is the Black Range, which runs parallel to, and about twelve miles west of the Grampians. In an earlier paper (see *Vict. Nat. 79* [12]: 1963) I described the two



shelters which had been located. Shelter No. 2 was the more interesting of them, not only because of the freshness of the paintings but also because two distinct occupational periods could be discerned. Contrary to the general situation in these wild ranges, this shelter was reached after a pleasant walk up a gentle slope through open timber country. It is true that before the open timber was reached a stretch of country covered with low shrubs had to be traversed. However, these were in flower and their infinite variety of colour and form made the walking more pleasant.

Upon reaching the shelter there was nothing to indicate that, although the climbing had been gentle, a respectable elevation had been reached. The true picture was revealed only when one scaled the rocks behind the shelter and it was realized that the top of the mountain had been reached. From this point the terrain drops abruptly from the back of the shelter on to a wide, timbered valley, beyond which a second mountain rises. This is known as Double Head to the bush walkers.

From where we were it looked interesting, as signs of erosion could be discerned on its precipitous walls, indicating the possible presence of shelters. However, on this occasion there was no time for further exploring and Double Head was left undisturbed. We contented ourselves with taking some long-range photographs.

Not many weeks later I found myself once more gazing at the mount from the top of No. 2 Shelter. In the interval since my last visit a party from the Hamilton Field Naturalists Club, including Mr. E. Tucker of Brit Brit, who had been such a prominent figure in the discovery of No. 2 and earlier examples, had visited Double Head, and had ascertained the existence of three hitherto unknown shelters, hidden amongst the eroded crags which were visible from where we now stood. Our party included Mr Tucker, Mr I. McCann of Stawell and Mr E. Barber of Port Fairy.

In due course, after having traversed the valley, we arrived at the first of these, which we named Black Range Shelter No. 3. It is an eroded overhang, about 12 ft 9 in. in width, facing almost due east. The designs were painted with red ochre on the walls, and consist of a cen-

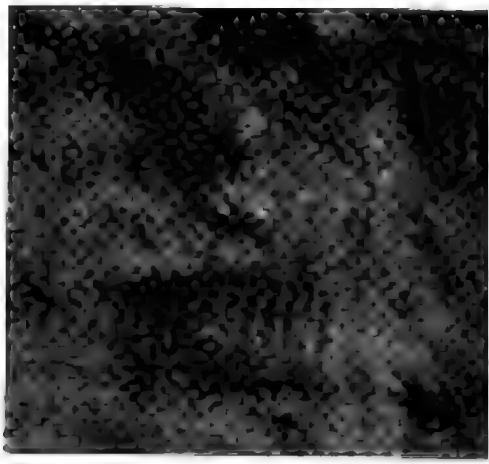
tral group comprising a three-pronged object enclosed in a circle 9 in. in diameter, below which another circle encloses a "bird track". To the left of these another three-pronged object is enclosed in three concentric circles about 9 in. in diameter, the whole somewhat reminiscent of the Central Australian "spiral motif". To the left again there is a double row of closely placed bird tracks, occupying a space 9½ in. in length, again enclosed in a circle. Immediately below the last two motifs is a rendering of the design known as "woman's apron", 12½ in. long and having 15 strings 3½ in. in length.

A few feet away from this central design there are two 7-pointed stars and an exaggerated bird track, 12½ in. wide and 10½ in. high. More bird tracks and several crosses are also painted here and there on the wall, and a stencilled human hand in a very faded condition is barely discernible in a shallow rock recess a few feet from the ground.

The honour of discovering Shelter No. 3 belongs to Miss Susan Tucker and Mr B. Bell, who first sighted it during the Hamilton Field Naturalists Club excursion.

Shelter No. 4 is about 100 yards from No. 3, to the north along the edge of the scarp. On the walls of this overhang there are two stencilled hands, in red ochre. Another stencilled hand was found on the wall of the scarp about 100 yards further north from No. 4. A further 300 yards, still travelling north, brought us to Shelter No. 5, which is at the northern end of the eastern scarp of the north head of Double Head. The paintings on No. 5 consist of two stencilled hands and two bird tracks, also in red ochre.

It is difficult to fit these new examples of native art in their proper place and sequence in the totemic life of the local natives. Shelter No. 3 was certainly an important centre, while No. 4 and No. 5 are obviously complementary to it. The absence of lizards and of human figures is significant. Because of this the temptation to pronounce Double Head a separate Totem centre is strong. Bird tracks and stencilled hands are common in rock art, but the grouping of the bird tracks in a circle, the concentric circles enclosing a three-pronged design, the woman's apron, and the 7-pointed stars are unique in Victoria.



Aboriginal Paintings in Shelter No. 3.

Bush Brushes

The fox brush was the traditional trophy of the chase. The Field Naturalist usually returns from an excursion into the bush with a different sort of "tale". If you have one worth mounting and preserving send it to the Assistant Editor, "Victorian Naturalist", 102 Murray Road, East Preston, N.18, Victoria.

Birds at Genoa

Mrs L. Galbraith, writing from Traralgon in February, reports:

Last month we camped for nearly two weeks at Genoa, beside the river, and found it a wonderful spot for birds. We listed over sixty species.

One morning I saw a family of Southern Emu Wrens *(Stipiturus malachurus)* in the tussocks of grass on the river bank beside the camping ground. I had never seen them before and was very thrilled. They are very dainty little birds and appear all chestnut from a distance. On closer observation both male and female are striped rufous on the back and head with paler rufous under-side and flanks and the male has a pale blue bib. The common Superb Blue Wren looked quite big and heavy compared with the tiny Emu Wrens.

Another interesting experience was hearing a splendid concert of mimicry by the Satin Bower birds. They kept hidden in a thicket of Tree Violet *(Hymenanthera dentata)* and laughed like a distant chorus of Kookaburras. Then came the calls of White-winged Choughs, Rosellas, Blackbirds, the carolling of Magpies and the cry of a Cockatoo, interspersed with the sound a horse makes when blowing chaff out of its nose. There were two large horses nearby so I expect that the Bower birds had learnt the sound from them. I have never heard anything like it. I watched them on many days but never saw a fully fledged male Satin Bower bird. Do they breed in Victoria or do only the females and young visit here after the breeding season?

We heard Bellbirds calling all day along the river and also frequent calls from several pairs of Eastern Whip birds.

[Satin Bower birds *(Ptilorhyncus violaceus)* are widely distributed throughout the Eastern Australian coastal districts from the Atherton Tableland to the Otway Ranges.

These birds demonstrate a flocking habit during the period from late summer to winter, but otherwise appear to be a stationary species with the breeding season occurring from October to December throughout the distribution.

The species has several "normal" call notes, and as well, is quite expert at mimicry, although not as versatile as the Lyrebird in this respect.

—R. H. J. McQ.]

Latrobe Valley Flora

The following notes have been sent for these columns by Miss Jean Galbraith, of Tyers, in western Gippsland:

A swampy patch of ground which had escaped the bulldozer near Yallourn North yielded a most interesting variety of flowers on January 20.

Most spectacular were the Large Tongue-orchids *(Cryptostylis subulata)*. There were hundreds, up to two feet high, and often with twelve flowers and buds. In one square yard I counted nine tall plants. A few flowers of Tiny Greenhood *(Pterostylis parviflora)*, almost withered, illustrated the habit of this normally autumn and winter flowering species of breaking into flower at unexpected times.

Amongst the dense growth of Pouched Coral-fern *(Gleichenia circinnata)*, Coral

Heath *(Epacris macrophylla)*, Yellow Hakea *(H. nodosa)* etc., both Purple Fairy Aprons *(Utricularia dichotoma)* and the bouched Tiny Fairy Aprons *(U. laterifiora)* were in bloom; the latter with flowers usually part way up the stem, like flags at half-mast, but sometimes terminal.

There was Narrow Comb-fern *(Schizaea fistulosa)*; and Slender Platysace *(P. heterophylla)*, two species of yellow-eye *(Xyris)* and two kinds of sundew *(Drosera)* were also in flower.

Farther along the road, Austral Lady's Tresses *(Spiranthes sinensis)* showed bright pink; there were Horned Orchids *(Orthoceras strictum)* eighteen inches high, another Large Tongue-orchid, Hyacinth Orchids *(Dipodium punctatum)*, and some rather dry Elbow Orchids *(Spiculaea hamiana)*

Behaviour of Starling Flocks

Mr Victor Jacobs of Doveton writes:

It was the last day of March. We had spent the afternoon on Phillip Island and the last point of our rapid tour was the castle-like Pyramid Rock. The mass of rocks, more like a cone than a pyramid, is separated from the headland by a narrow stretch of water and is formed mainly of massive, long, brown slabs inclined inwards. Around the base large, smooth, black basalt boulders are scattered. At the bottom and extending partly up the slides of the cone was a mass of filmy vegetation that gave the Pyramid Rock an ethereal appearance

Returning some three hundred yards inland, we were brewing a pot of tea before setting out for home when I vaguely perceived a flock of birds flying overhead, then another and a third. My attention being now fully alerted, I watched a fourth flock of some hundred birds heading due south. They were dark, smallish birds and from their habit of gliding with closed wings for short distances, I identified them as Starlings. Were they following the earlier flocks? If so, where had their predecessors gone? I used the binoculars to scan the sky from west to east, looking very carefully to the south where the fourth group had flown, but not one bird of any of the four flocks was to be seen. I was curious and anxious to solve the mystery.

When the fifth flock flew over, I watched them and as they reached the end of the headland, I saw them go into a steep dive and disappear from view. A few more flocks followed in the same way and as I stood there I remembered the behaviour of starlings in the English Midlands. Some of these fed during the day in the outskirts of Birmingham and at dusk flew in from all points of the compass to roost on the city buildings. Many an evening in the Birmingham Town Hall had been marred when their twittering had interlopted the slow movements of a symphony.

We made a dash for the end of the headland, our arrival coincided with the next wave of birds and we were in a good position to view all that happened. First an almost vertical dive to the water's surface, then a swift zig-zag to avoid some rocks projecting from the sea, a little swoop over the basalt boulders and the new arrivals landed to be lost amidst the many starlings that had already arrived.

These were far from settled for the night. Amongst the greenery and on the bare rock face many dark bodies jostled and manoeuvred for position. At 6.15 p.m. the last flock touched down and we estimated that approximately a score of flocks numbering many hundreds of birds were perched in a very safe place for the night.

[Starlings have been recorded roosting in caves and on cliffs in the Scottish islands and flocks can be seen and heard settling for the night on the Customs House building, Flinders Street, Melbourne.

—J.R.H.]

Morels

Mr I. R. McCann's note (*Vict. Nat.* (80) p. 341) has prompted Mr W. H. King of Warrandyte South to send us this further information on the distribution of the fungi:

Last September, whilst in the Wyperfeld National Park, Mr F. Rogers and I found and photographed several Morels in Mallee scrub about three miles beyond the Eastern Lookout. Mr. J. H. Willis suggested that this could be a first record for this area.

Nature Notes from Ringwood Field Naturalists Club

In spite of the many subdivision and building operations in and around Ringwood there were still six orchid species flowering during the last month. Three midge-orchids — *Prasophyllum morrisii*, the Bearded Midge-orchid; *Prasophyllum archeri*, the Variable Midge-Orchid; and *Prasophyllum despectans*, the Sharp Midge-orchid—have been seen in several areas. The attractive *Eriochilus cucullatus*, the Parson's Bands, is also flowering. Of the Greenhoods, *Pterostylis parviflora*, the Tiny Greenhood is in bloom. Reports of *Pterostylis obtusa* flowering have been received from Mount Evelyn and Kinglake.

On the recent excursion, on Saturday, April 11, to the Beenak area there were abundant scratchings and sounds of the Superb Lyrebird. It was heard many times and also seen among the ferns at the source of the Bunyip River. Among the many calls it gave was an imitation of the Black Cockatoo, which was present in the area. An item of attraction was the large number of Hairpin Banksia (*B. spinulosa*) and Silver Banksia (*B. marginata*) in bloom. The Yellow-winged Honeyeater entertained members with its song and feeding habits as it flitted from flower to flower. Spine-tailed Swifts were observed milling over the gap and, as they have been seen here on previous occasions, it was felt that this has become a favourite feeding ground because of the concentration of insects due to rising air currents.

The autumn invasion of Ringwood area has started. Pied Currawongs and Crimson Rosellas are down from the mountain. Large numbers have been seen and they are expected to remain until their source of food, the berries, has been exhausted. The White-plumed Honeyeater has become very common particularly in *Hakea laurina* (Pincushion Hakea). It is not uncommon to find these birds apparently intoxicated by the nectar. They can be approached very easily and are very slow and unsure in their movements.

On the recent fauna survey excursion to the Toolangi area, members were startled by the screech of a Powerful Owl. This call is very weird and unnerving and those members will long remember it.

The remarkable little Tailed Spider (*Arachnura higginsi*) has returned now that it is autumn or, possibly, it is only in the autumn that it is observed. This spider has the abdomen prolonged into an elongated "tail", tipped with three black points. Its form gives it a scorpion-like appearance, but it is harmless. It has curious elongated grey silken egg sacs which are suspended in a chain in each snare. The spider usually takes up a position below the last egg sac. If one looks closely, a minute red creature may be seen around the net of spider. This is the male of the species. It looks more like a mite than the spider it really is. The web is very tangled and untidy looking.

Subscriptions Now Due

The Field Naturalists Club of Victoria is administered by a relatively small number of honorary office-bearers.

The growth of the club and the expansion of its activities, particularly in connexion with the production of the *Victorian Naturalist*, are continually adding to the burden of work.

Membership fees and subscriptions to the *Naturalist* for 1964-65 were due for renewal by May 1. If you will not be paying your fees at one of the forthcoming general meetings, please remit them by post. Receipts will not be sent for payments by cheque unless requested

This procedure will save office-bearers time, and expense, in sending out reminder notices.

A Larger Field of View

By D. E. McINNES

When you look at an object through a microscope, you see a picture in the form of a circle which appears to be some inches in diameter. This is the field of view, and it is determined by the lenses of the objective and the eyepiece and by one other factor —the diaphragm of the eyepiece.

Unscrew the top lens of the eyepiece. This is the eye lens, and between it and the bottom lens (the field lens) there is a metal disc with a circular hole. This is the diaphragm. The field lens focus is a real image formed by the objective at the level of the diaphragm, and the eye lens magnifies this image to the eye. The purpose of the diaphragm is to restrict the image to the centre portion and so cut out the outer image which is not in sharp focus; also it stops the diffused light at the edge from entering the eye.

However, when using low powers it is very often desirable to see more of the object, even if it is not at all sharply focused, and this can be done by removing the diaphragm completely from the eyepiece. It is only a tight fit in the tube and can be removed by unscrewing both the eye lens and the field lens (mark which end is which). The diaphragm is like a dished washer. Knock it out towards the eye lens end with a piece of wood dowel. Use care not to damage the internal threads of the eyepiece tube.

Replace the lenses and observe the increase in the field of view. In particular the Leitz 6×B eyepiece will now give a field approximately 50% greater. This is very handy when searching for an object or observing a large area.

The diaphragm need not be replaced unless you want the best definition possible. Replace it from the field lens end and move it up until the hole is seen to be in sharp focus with the eye lens when the latter is screwed back into position. Then replace the field lens.

The Water Bear or Tardigrade

By W. J. Genery

Whilst going over some water that I had acquired from the Bellarine Peninsula, I noticed some unusual movements among a cluster of desmids. I recognized at once the Water Bear or Tardigrade as it is called. This bear was engaged in making a meal from a desmid called *Penium margaritacium* and was sucking the endochrome from one end: it was almost wrapped around the *Penium* and working its legs in its endeavours to empty the one half completely. After about five minutes, when the *Penium* was empty, the bear ambled off with slow, ungainly movements putting its eight legs out and showing the four sharp, curved claws which are attached to each.

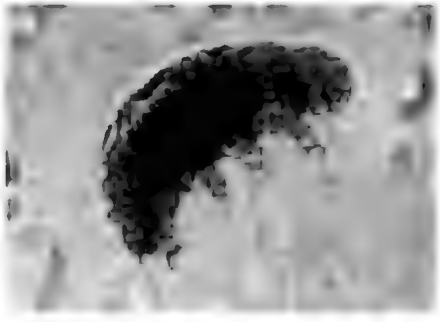
The Water Bear, or *Macrobiotus*, is a very elusive microscopic organism, about 0·375 mm. in length, and I believe that it has not been seen in Victoria for quite a number of years. Yet I had the good fortune to have three on the slide at once.

This organism belongs to the Class Arachnida within the Phylum Arthropoda. Because of the pearly white iridescence of its body it is just visible to the naked eye. It has an elongated oval shape and the rather flexible body is composed of nine segments including the blunt head. The round suctorial mouth leads to two parallel tubes which connect with the large oval gizzard situated behind the head; the tubes then continue to the stomach which can also be seen in the dorsal part of the body. Both of these organs are always full of food which the organism has absorbed. The stomach is much darker in colour and about twice as large as the gizzard.

The bear has four pairs of short, squat legs and each leg terminates in four long, curved claws, which are constantly opening and closing.

The round suctorial mouth is repeatedly pushed out in front and then withdrawn as if small particles of food are being sucked into the mouth.

I noticed that when the bear came close to a *Stentor*, rotifer or any other organism, the organism approached would immediately turn about and swim in the opposite direction as if the bear had some strongly pronounced repellent property. This could explain why the tardigrade, which is slow moving, does not appear to be chitinised, and having no mandibles or any other means of defence, has survived down to the present time. According to earlier writers, the tardigrade is herma-



Water Bear, × 100.

phrodite and periodically produces a small number of ova. Proportionally to the parent the ova are large and they have been found attached to the empty skin which the bear casts from time to time. I saw one empty skin but there were no eggs attached to it.

The organism has been resuscitated after being completely dried up. This shows that it can withstand dry conditions in the same way as the rotifers which are often found with it.

The most likely place for the Water Bear to be found is in the mud and decayed leaves in the gutters around the roofs of houses where it is generally in the company of rotifers. It is seldom found in ponds or open water.

Field Naturalists Club of Victoria

General Meeting—April 13, 1964

About 150-200 members and friends almost filled the hall. The president, Mr M. K. Houghton, was in the chair, and among the country members present was Miss L. Banfield from Ararat.

Dr E. H. Ealey was the speaker for the evening. His subject was "The Euro", and the talk was illustrated by an excellent film. Dr Ealey had been able to study this marsupial whilst investigating a situation that had arisen in the Port Hedland area, where sheep introduced onto the properties appeared unable to compete with the indigenous animal. Euros were marked by coloured plastic collars and by automatic dye-spraying apparatus in order that their movements could be followed.

Observations had been made on the drinking habits of the animal, the effect of ambient temperature changes on heat control by licking, and on the reproductive physiology. Judging by the fact that few animals lived more than six years, the mortality must be high, but little was known of the main causes of death. In the area in question, the animals could be destroyed in numbers without danger to the species, but this would not improve the situation of the sheep. Faulty pasture management, particularly extensive burning at the wrong season, had caused pasture deterioration to a level at which, although still suitable for the Euro, it was not capable of supporting many sheep.

After his talk, Dr Ealey answered many questions from his interested audience, and Mr A. J. H. Faithall then moved a vote of thanks which was carried by acclamation.

The president announced that members would learn with regret that Mr N. A. Wakefield, through pressure of work, would be unable to accept renomination as editor of the *Victorian Naturalist*, and he expected that council would appoint Mr J. R. Hudson to the post until the annual general meeting in June. Mr J. A. Baines said that for over eleven years Mr Wakefield had done a splendid job as editor of the *Naturalist* and it would be very difficult to replace him. In spite of his other activities, he had produced a consistently good journal. Mr Baines moved a vote of thanks to Mr Wakefield for the work he had done in the editorial chair. The motion was seconded by Mr E. Swatbrook and carried with most enthusiastic applause.

The twelve persons listed on page 381 of the April *Naturalist* were elected to membership of the Club. It was regretted that the list contained a misprint; the last of the ordinary members should have read "Miss Lucia A. Dalton, Box Hill".

Among the exhibits were specimens of the skipper butterfly, *Trapezites symmomus*, and two species of ant-lion adults (R. Condron). Mrs E. Bennett showed specimens of the introduced snail, *Helix pisana*, which had been present in great numbers on the exposed cliff-top at Childer's Cove. Another member described how this snail had been seen, and heard, eating a page from a glossy magazine, possibly attracted by the gypsum content of the paper.

Messrs D. E. McInnes and W. C. Woollard showed, under club microscopes, some desmids and a rotifer colony. Miss E. Ratt exhibited three green pupae of the Wanderer Butterfly (*Danaida plexippus*).

Mrs Bennett and Mr Grant-Taylor drew attention to the uncontrolled ravages of bulldozers in the Heytesbury and Lower Glenelg areas. In the former, some 7000 acres had been cleared for settlement without leaving a single tree as shelter for stock or settler's home. In the latter, native vegetation had been cleared away to plant pines. Miss Jean Galbraith pointed out the desirability of leaving windbreaks wherever land was cleared. Mr J. R. Garnet mentioned that a report had been drawn up by the club and the R.A.O.U. in 1947, advancing a proposition that 80,000 acres of the Lower Glenelg area should be kept unchanged as National Forest Reserve. Only about a quarter was now left and it was most desirable that action be taken at once to persuade the Forests Commission to stay its hand. The matter was referred to council.

Before closing the meeting the president presented Miss Galbraith with accessories needed to convert her bridge and tube instrument into a complete F.N.C.V. microscope. In thanking the Club, Miss Galbraith said that the microscope was in constant use and she was sure that the production of the instrument was a great help to members.

Geology Group—March 4, 1964

Twenty-three members and visitors were present, with Mr L. Angior in the chair. Master L. McLaurin reported on an australite collecting expedition to Port Campbell, Victoria, with Mr R. Gill and representatives of the Space Organization of American Aerodynamics. The area was systematically plotted and in one place excavation to a depth of two feet was carried out. The australites are being given careful scientific examination as an aid to space research. Following on his article in the *Naturalist*, Mr D. McInnes had rock sections and polishing material for sale. Mr Angior mentioned an excellent article in the *Melbourne Walker*, on the Building Stones of Melbourne, by Mr D. Hemmy. Arrangements were made for an excursion to Bayview Quarries, Narre Warren, on Sunday, March 22.

Mr R. Dodds was the speaker for evening, dealing with "The Geology of the Palaeozoic". After outlining the structure of the Australian continent as it stands today, a return was made to the beginning of things. Various theories as to the origin of the earth were summarized, followed by an explanation of the geological time-scale. The story of

the development of geology in England and the labours and trials of many of the early workers, were of considerable interest. To close the lecture, the speaker then took each of the Palaeozoic periods in turn, explaining the fossils and outstanding factors in each, with particular reference to Australia.

Exhibits: Fossils and large agate collected in Tasmania by Mr Harrison (D. McInnes); diabase aboriginal axe from North Queensland (N. Wigmore); banded mud-stone, schist, chlorides and iron pyrites from Tasmania (F. Miller); opal from Andamooka (D. Collyer); biscuit sea-urchins, heart urchins, lamp-shells from Point Addis (I. Sault); brown coal from Anglesea, concretions from cliffs near Lorne (Miss V. Dickson); copper ore specimens from smelters, Mt Lyell, Tasmania (D. Hemmy).

Geology Group—April 1, 1964

Mr L. Angior was in the Chair, with twenty-three members and visitors attending. Mr D. McInnes reported on the excursion to the Bayview Basalt Quarries, Narre Warren, on Sunday, March 22. Twelve members attended, and in the quarry itself the lava flows and columnar jointing were examined. Specimens with olivine inclusions were collected. Under the basalt on the floor of the quarry, in a dark-coloured clay, a comprehensive collection of fossil leaves was made. The secretary read extracts of a geological nature from letters written by Mrs K. Cheslin, who is making a leisurely trip around Australia. Arrangements were made for a weekend trip to Bendigo, on April 18 and 19, as guests of the local Field Naturalists Club.

Subject for the evening was "Diatomaceous Earths", by Mr Graham Sheil. The speaker first mentioned the uses to which the earths were put as filters for swimming pools, clarifying wine, assisting in the insulation of pipes, polishing material, and in explosives. The structure of diatoms was explained as consisting of two minute shells of silica, fitting one over the other. Details were given of the use of diatoms to test the resolving powers of lenses in microscopy, as well as of their ecology. The quarry at Happy Valley, south of Ballarat, was explained in detail, and the methods of working outlined. Many questions as to the properties of the earths were answered, and Mr A. Cobbett explained the use of the material in explosives. Mr D. McInnes moved a vote of thanks to the speaker for his most interesting and informative talk.

Exhibits: Series of minerals from Asia Minor, to be identified by Mr A. Cobbett (L. Bairstow, per R. Dodds); opalized shells, sponges, corals, opal patch, from Lightning Ridge, fossil wood, Gilgandra, N.S.W., inclusions in older basalt from Kitty Miller Bay, Phillip Island, bones and teeth of Diprotodon from Queensland (R. Davidson); selenite, anhydrite, alabaster to illustrate various forms of gypsum (A. Cobbett); flint nodules, dolomite in different colours, australites, pumice, all from South Australia (J. Miller); iron stained aragonite (Mrs M. Salau); fossil leaves and section of granodiorite, under microscope, Narre Warren (I. Sault); fossil leaves and basalt sections from Narre Warren (D. McInnes); turquoise in slate, New Zealand green-stone axe, mounted mineral specimens from New Zealand (A. McCay); basalt with calcite and olivine, lachlyte from Narre Warren (N. Wigmore); massive piece of diatomaceous earth from Happy Valley (G. Sheil).

Botany Group—March 12, 1964

Miss P. Carolan's lecture, "Some Eucalypts and their Distribution", evolved into something rather broader; the occurrence of many species of other genera being also related to geological formation and climate. It was stressed that no one of the many factors in climate and formation was in all places decisive, although one factor may sometimes be dominant. Supported as it was by slides, which were much to the point, this proved a very absorbing theme.

A report on the excursion in the Kinglake district, on March 1, was given by Miss M. Butchart, and the chairman (Miss M. Lester) kept a variety of urgent matters previously discussed before members' attention, including that of magazine contributions.

Botany Group—April 9, 1964

Miss M. Lester's "Introduction to the Conifers" supported by drawings, sketches and charts, ably clarified the group's concepts regarding the subject of the forthcoming Nature Show exhibit.

Gymnosperms and angiosperms were compared, and there followed informative descriptions of reproductive processes, evolutionary aspects and problems in classification.

Reports covered the recommendations of the book committee, which was given by the chairman, and of the arboretum excursion, which was given by Miss M. Bland. Organization and provision of specimens for the Nature Show was then discussed. It was decided that the group's next excursion would be to Sherbrooke, on May 3, meeting at 11 a.m. at Kallista camping reserve.

Marine Biology and Entomology Group—April 6, 1964

Twenty-two members attended, with Mr R. Condron in the chair. As the group secretary, Mr J. Strong, will be overseas for some months, Mrs Z. Lee was nominated to act in his absence. For May, June, July and August, the group's meetings will be held at the National Herbarium.

Discussion took place on exhibits for the September Nature Show. Mr D. E. McInnes suggested a beach scene, and members were invited to contribute ideas for it. Mr Harrison suggested that a sketch be made of the proposed scene, to be brought to the next group meeting. Mr McInnes is to be in charge of the marine biology section of the show, and Mr Condron of the entomology section.

The guest speaker for the evening was Mr H. B. Wilson, Senior Entomologist, Burnley School of Horticulture, his subject being "The Fly Menace". Mr Wilson's talk proved of great interest. He differentiated between the house fly and the bush fly, stating that the breeding habits of the latter had not yet been worked out. After the talk, members asked many questions, and a vote of thanks was proposed by Mr E. Coghill.

Exhibits: Mr McInnes showed two microscope slides of a fly and a fly's proboscis. Miss B. Hurkness exhibited a Wanderer Butterfly taken at Tower Hill. Miss L. White showed larvae of the Blue Gum Moth, which she said was a night feeder. Mr Condron exhibited two species of lacewing, collected at Ringwood. Mr Strong showed two specimens of the wasp, *Salius bicolor*, both females, one taken at Wattle Park and the other at Warburton.

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2/6

Fly Agaric, *Amanita muscaria*.

This photograph by Edith Coleman of the well-known poisonous toadstool is reproduced from the *Victorian Naturalist*, 1931.

Vol. 81, No. 2

F.N.C.V.

June 4, 1964

The Victorian Naturalist

Editor: J. R. Hudson, B.Sc., M.R.C.V.S.

Assistant Editor: R. H. J. McQueen, B.Sc., Dip.Ed.

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Front Cover:

Helmeted Honeyeaters, *Meliphaga cassidix*, at the nest. This photograph by A. H. E. Mattingly, of one of Australia's rarest birds is reproduced from the *Victorian Naturalist*, 50:64.

Introducing Desmids

By E. J. LeMaistre

An introduction to desmids is an introduction to one of the most beautiful and fascinating of the many forms of microscopic algae: their vivid green colouring, simple or complicated contours, symmetry and natural beauty give the viewer an insight into a tiny world of nature's "jewels".

Varying in size, from as small as 15 microns to veritable giants a millimetre in length, they do not call for expensive equipment, in fact 100 × magnification, particularly in conjunction with dark ground illumination, will give excellent results.

Unicellular fresh-water organisms, rarely even tolerating brackish conditions, the greater number of desmid species prefer slightly acid waters in swampy areas or water such as natural ponds or small lakes, drainage ditches and the like where the water is quiet with little or no current. The lake in the Botanic Gardens produces some nice forms at times, but artificial fish-ponds seem to produce only some of the very small forms. Collection of desmids may be carried out by drawing a microscopist's collecting net through the water, but the author has found that greater success can be achieved by gathering the larger aquatic plants and washing these in the collecting net thus filtering into the bottle those desmids which have become detached from the plant, where they had lodged or adhered, as well as the free-floating forms.

The desmids are all unicellular but there are some species which have apical processes joining cells together in a ribbon, in which case only careful study will differentiate these from the filamentous algae.

There are two groups of desmids, the Saccoderm (Mesotaenioideae) which used to be referred to as "pseudo" desmids, and the Placoderm (Desmidioideae) or "true" desmids, the difference between the two groups being in the manner of reproduction. In the Saccoderms which are generally more simple in structure, the cell wall is continuous and does not break into two distinct parts during reproduction; whereas in the Placoderms, which show a much greater variety of form and structure, the cell wall consists of two halves, the semi-

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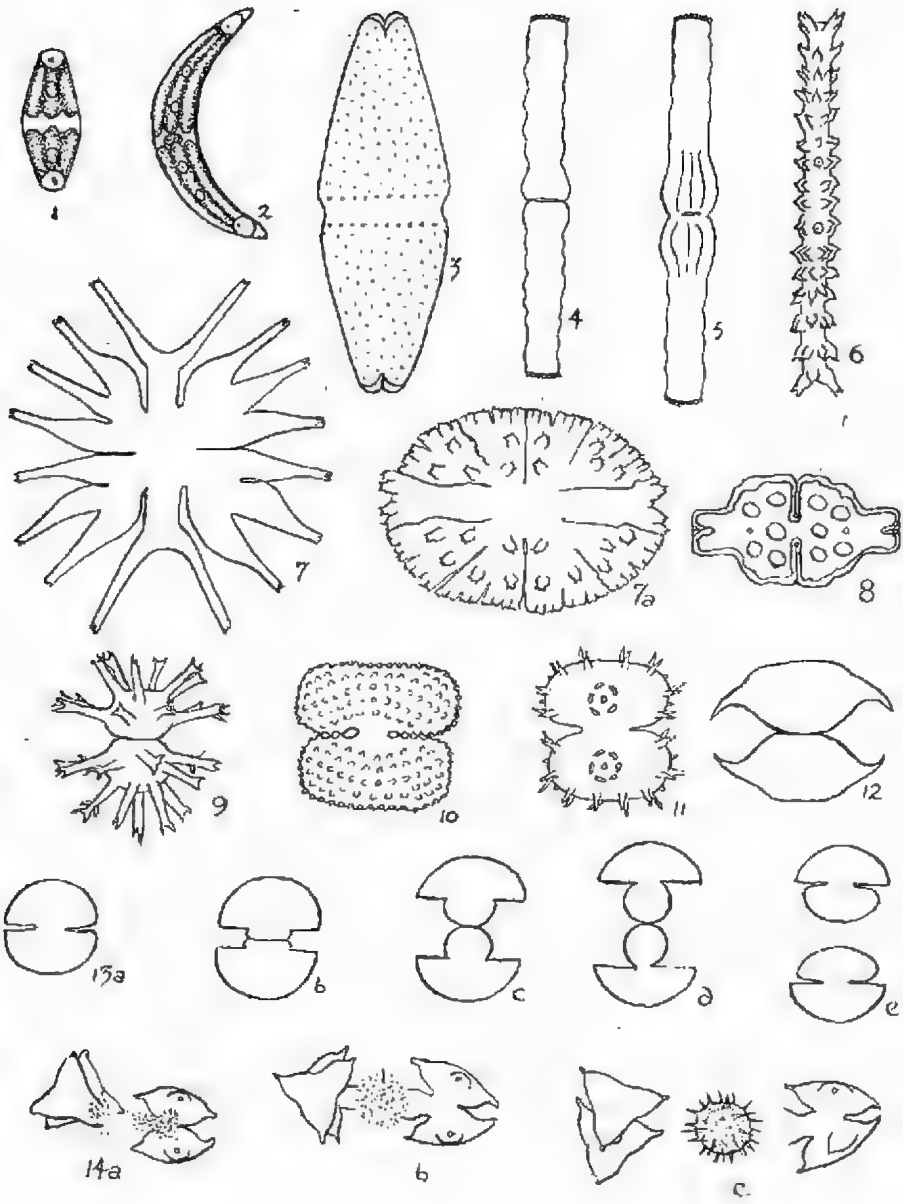
Diagrammatic illustrations of the larger forms of Placoderm Desmids.

1. *Penium.*
2. *Closterium.*
3. *Tetmemorus.*
4. *Pleurotaenium.*
5. *Docidium.*
6. *Triploceras.*
7 and 7a. *Micrasterias.*
8. *Euastrum.*
9. *Staurastrum.*
10. *Cosmarium.*
11. *Xanthidium.*
12. *Arthrodesmus.*

13a-e Asexual reproduction in *Cosmarium* sp. showing formation of daughter cells and eventual division.

14a-c. Sexual reproduction in *Staurastrum* sp. showing formation of resting zygospore.

Note: These illustrations are shown only as a guide to the genera and not for the identification of any species.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cells, and division occurs in asexual reproduction with two resultant desmids each made up of a mother semicell and a daughter semicell.

Sexual reproduction is achieved by a process of conjugation whereby two similar desmids join, their contents fuse and develop a thickened wall, which may become elaborately ornamented with spines or protuberances, thus forming a resting zygospore. This sexual phase in desmids is often described and illustrated but is rarely found in field collections.

Structurally the Placoderm desmids are generally constricted in the middle, such constriction varying from a slight narrowing in the central portion of the cell to quite a deep incision almost dividing the cell in two. The portion of the desmid each side of the constriction is referred to as the semicell, the constricted portion still connecting the two semicells is called the isthmus, and the space between the semicells created by the constriction the sinus. The portion of the semicell nearest the isthmus is the base and the point furthest away from the isthmus the apex of the semicell.

This description of the structure may seem incorrect when applied to *Closterium* (see illustration) but in such cases where the cell seems entire and not constricted, the protoplasmic contents of the cell in which the chloroplasts are situated is divided into two noticeable portions. A particularly interesting phenomenon can be seen in certain of the species in the genus *Closterium* which have vacuoles near the apices of the semicells. These vacuoles contain minute particles of gypsum which are constantly jiggling around—the result of Brownian movement.

Desmids should be examined as soon as possible after collection as the various forms of life in the material tend to die and deteriorate, and furthermore, the animal life present feeds on the smaller algae. Preliminary examination of the collection may be best achieved by the use of a petri dish into which is introduced some of the gathering which has settled to the bottom of the collecting jar, with sufficient water to at least cover the base of the dish. For more detailed examination, a pipette should be used to draw up water from the petri dish, where desmids have been located, and this water is then placed drop by drop on a standard 3-in. × 1-in. glass slide. When examination under low power shows that the desmids have been transferred to the slide, a cover-slip is added and higher power can then be used.

If a gathering is found to be rich in desmids and it is desired to keep the material for later study, the formal-acetic-alcohol combination has been found to be an excellent preservative, and material can be kept by this method almost indefinitely. It is unfortunate that chlorophyll, which gives the desmids their vivid green colour, fades after a time and a lot of their natural beauty is then lost. Unlike the diatoms, which owe their beauty to a silicous skeleton and are therefore much more attractive in a dead condition, desmids are best viewed as living cells; but they can be stained using such stains as methylene blue, iron haematoxylin, etc., which show up the internal structure of the cell quite clearly.

The following Key to the genera of desmids is that used by Dr Gerald A. Prowse, Fish Culture Research Station, Batu Berendam, Malacca, to whom the writer offers grateful ack-

nowledgement, in his booklet *An Introduction to the Desmids of Malaya*. This analytical Key is based on the most distinguishing features of the cells and if studied in connection with the diagrammatic illustrations should enable the reader to differentiate between the various genera, particularly those falling into the 9-20 category of the Key which constitute the more readily found and furthermore by far the most attractive forms.

Analytical Key to the genera of Desmids

1.	Cell walls unsegmented, remaining in one piece during reproduction. Pores absent. SACCODERMS	2.
1.	Cell wall segmented, breaking into two parts during spore formation. Outer wall well-differentiated. PLACODERMS	9.
2.	Cell relatively short, usually unconstricted. Cell wall without a differentiated outer layer.	3.
2.	Cells elongated, unconstricted, forming loose filaments. Cell wall with a differentiated outer layer bearing very small warts or spines.	8.
3.	Cells solitary	4.
3.	Cells united in short filaments.	7
4.	One chloroplast in each cell	5.
4.	Two chloroplasts in each cell	6.
5.	Chloroplast spirally twisted, parietal. *Spirotaenia*	
5.	Chloroplast plane, axile. *Mesotaenium*	
5.	Chloroplast with a small lateral excavation, cells slightly curved (arcuate) *Roya*	
6.	Chloroplasts star-shaped, radiating from a central pyrenoid *Cylindrocystis*	
6.	Chloroplast in 6-12 radiating plate-like longitudinal ridges, prominently notched at the edges. *Netrium*	
7.	Short filaments, chloroplasts plane, axile. *Ancylonema*	
8.	Chloroplast axile and not spiral. *Gonatozygon*	
8.	Chloroplast parietal and twisted spirally. *Genicularia*	
9.	Point of division of the cell variable; only rarely fixed at the isthmus.	10.
9.	Point of division of the cell always fixed at the isthmus.	11.
10.	Cells of moderate length, straight, more or less cylindrical. *Penium*	
10.	Cells elongate, strongly attenuated towards each end, and usually curved, often moon-shaped. *Closterium*	
11.	Free-living.	12.
11.	United in colonies.	19.
12.	Cells elongated, rod shaped.	13.
12.	Cells shorter and broader, rounder in face view, or with several arms.	15.
13.	Cells with apical incision. *Tetmemorus*	
13.	Cells without apical incision, cylindrical.	14.
14.	Cell elongate, apex truncate, base of semicell plicate (pleated) *Docidium*	
14.	Cell elongate, apex truncate, base of semicell not plicate. *Pleurotaenium*	
14.	Cell elongate, apex bearing diverging processes, and cell wall bearing rings of spines. *Triploceras*	
15.	Cells with lobed margins, compressed, elliptic or fusiform in end view	16.
15.	Cells with more or less rounded margins, often furnished with spines, warts, or radiating arms.	17.
16.	Cell very compressed, with deeply lobed or incised margins. Apices lobed or not, but without incision. *Micrasterias*	
16.	Cell with moderately lobed margin, and usually with an apical incision. Face of semicell bearing a central protuberance *Euastrum*	
17.	Cells triangular, quadrangular or up to 11-radiate in end view, often bearing long radiating arms. *Staurastrum*	
17.	Cells only 2-polar, elliptic or circular in end view.	18.

18. Cells without, or with only very short spines or warts. *Cosmarium*
18. Cells with many long spines, often arranged in pairs. Usually a protuberance on face of semicell. *Xanthidium*
18. Cell usually with only one spine on each side of the semicell, rarely two. No protuberance on face of cell. *Arthrodesmus*
19. Cells united in ribbon-like filaments.
19. Colonies otherwise.
20. Cells joined directly apex to apex without any special apical process
20. Cells joined by special apical processes.
21. End view of cells round.
21. End view of cells elliptic. Cell cosmarioid. *Spondylosium*
21. End view of cell 2, 3 or more polar. Cell not cosmarioid.
22. Cell division taking place by a special ring-like ingrowth (replication) of dividing wall. *Gymnozyga (Bambusina)*
22. Cell division without special ring-like ingrowth. *Hyalotheca*
23. End view of cell 2, 3 or 4 polar, not lobed into projecting wings. Division usually by replicate walls. *Desmidium*
23 End view with four strongly projecting wings. *Phymatodocis*
24. Cells joined by longish apical processes which overlap the end walls of neighbouring cells. *Onychonema*
24. Cells joined by short processes abutting on each other.
25 Cells usually elliptic in end view. *Sphaerozosma*
25. Cells 3-4 polar in end view. *Desmidium* (in part) *Streptonema*
26. Cells forming roundish colonies. Cells cosmarioid joined by long threads of mucilage. *Cosmocladium*
26. Colonies forming chalky crusts. Cells at the ends of mucilage tubes encrusted with lime. *Oocardium*

Notes on Microchiropteran Bats

By John L. McKean and L. S. Hall

Bats and Moths

Although it is well known that many species of insectivorous bats return to their roosts in caves and houses to consume moths, (Nicholson 1937, Baines 1944 and Hodgson 1944) this habit does not appear to have been recorded for any Australian species.

In March 1956, a colony of fifty Lesser Long-eared Bats (*Nyctophilus geoffroyi*) was discovered in a house at Mt Martha, Victoria. The owners had been absent from the home since the previous December and were rather dismayed on their return, not so much by the presence of the bats, but by the scattering of insect remains throughout the house. On inspecting these remains McKean found that about 95 per cent were moths' wings and the remainder were the elytra of small beetles.

R. John Edge (pers. comm.) has informed us of the presence of large quantities of moth wings in a sea-cave near Warnambool which is the only known Bent-winged Bat (*Miniopterus schreibersi*) breeding colony in the district. Neither Mr Edge nor ourselves have ever observed or seen reference to such remains in other caves inhabited by *M. schreibersi*.

Lesser Long-eared Bats: Breeding Notes

On November 2, 1963 a maternity colony of *Nyctophilus geoffroyi* was

TABLE I

Measurements in mm. of young *Nyctophilus geoffroyi*

No.	Sex	Length	Wing (Radius)	Tibia
MH 26	Male	57·0	28·7	11·6
MH 27	Male	60·0	30·2	12·2
MH 28	Female	62·0	31·7	12·8
MH 29	Female	56·0	28·3	11·8
MH 30	Male	57·5	29·8	12·0
MH 34	Male	36·0	11·1	7·3
MH 35	Male	34·0	10·2	6·5

discovered under the bark of a live rough-barked gum tree growing in a lignum swamp 15 miles north of Booligal, N.S.W., by W. Braithwaite and McKean. The colony contained about six adults and twelve young, of which one lactating female and five young bats were captured. The young bats all appeared to be approximately the same age, being about half the size of the adult female. The facial characteristics including the nose leaf were well developed and the bodies were covered with fur. Most of the young were capable of flight but several escaped, clinging to the ventral surface of an adult, presumably a parent.

Measurements of the five young examined (MH 26 to MH 30) are given in Table I. On the 23rd November 1963, R. Smith caught two heavily pregnant *N. geoffroyi* at Tumut. Both had been stunned when the tree they were in was felled. One of the bats died and, on dissection, was found to contain two young almost ready for birth. The other female gave birth to two young that night. Measurements of the two newborn young (MH 34 and MH 35) are given in Table I. In late October 1962, McKean captured several *N. geoffroyi* in a mist net at Barren Box Swamp near Griffith, N.S.W. These were maintained in captivity for a short period at Canberra by K. Simpson and two females both gave birth to twins on the 2nd and 28th November.

It would appear that *N. geoffroyi* regularly gives birth to twins whereas the only other species on which we personally have data i.e. *Eptesicus pumilus*, *Rhinolophus megaphyllus* and *Miniopterus schreibersi*, give birth to single young. P. Dwyer (pers. comm.) has records of *E. pumilus* giving birth to twins in the New England District, N.S.W.

Bats Swimming

Water under or surrounding trees inhabited by colonies of forest bats may not be a hazard to the bats. At least one species *N. geoffroyi*, is able to swim quite well. An individual of this species when disturbed from a colony in a swamp at Booligal fell into the water. Although it was unable to take off from the water the bat made its way quickly across the surface. It floated on the water with extended tail and beat its partly extended wings.

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The Sydney Funnel-web Spider *(Atrax robustus)* in Captivity

By G. Kaire.*

For a number of years a colony of several hundred Sydney Funnel-web spiders was kept at the Commonwealth Serum Laboratories, thus providing a unique opportunity to study the behaviour of these spiders in captivity. Some relevant information has been reported earlier by Wiener (1957, 1959) and Kaire (1963) and the reader may refer to their papers. Bücherl's (1956) experience with the breeding and keeping of poisonous spiders at the Butantan Institute (Brazil) is of great interest to any person who has to look after a number of live spiders in captivity.

Transport of Spiders:

The spiders were sent to the Laboratories in plastic jars with perforated screw tops; each jar contained one specimen only. It is essential to provide moisture during the transport; a piece of cottonwool glued to the bottom of the jar and moistened before despatch is adequate. The number of spiders which were dead on arrival was small; most of these had been crushed by a heavily moistened cottonwool pad which had become detached. The time spent in transport must be short.

Keeping of Spiders in the Laboratory:

The spiders were kept in glass jars with perforated screw tops in boxes or a cabinet. The bottom of the jars was covered with moist soil. Attempts were made to replace soil with foam plastic; however, experiments proved that this increased the mortality of spiders. The surface of the plastic rapidly became eroded and the spiders, even when fed regularly, soon appeared sick, as evidenced by translucent abdomens. Even when such spiders were transferred to jars containing moist soil they did not recover but died within a short time. The feeding of a large number of spiders presents difficulties as it is impossible to provide them with insects in sufficient quantities. Butterflies, caterpillars, flies, beetles and spiders were readily attacked and consumed. Earthworms and slaters had no appeal to Funnel-web spiders; Red-back spiders however can be fed on slaters. Many adult *Atrax robustus* spiders can be fed on pieces of juicy meat attached to a thread for easy removal. However, fresh liver was eaten more readily. The food was dangled in front of the spider and, as soon as the spider started chewing it, the lid was replaced. Small spiders do not eat meat or liver. Although spiders can survive without food for long periods (over 6 months), regular supply of water is essential.

Exposure to temperatures over 37°C. kills the spiders rapidly, even when sufficient moisture is provided. Temperatures of about 20°C. appear to be most suitable for survival, although lower temperatures are well tolerated. On the average the spiders survived in captivity 4 months; spiders surviving 6 months were common and a few lived over a year. The lifespan of male *A. robustus* in captivity is significantly shorter than that of female specimens.

Moulting of immature spiders was frequently observed. However I have seen neither adult males nor females (body length over 2.5 cm.) moulting.

*Commonwealth Serum Laboratories, Parkville, Vic.

Reproduction:

Egg-sacs were made and eggs laid from the last days of July to the end of October. The spider first makes the saucer-shaped dense bottom web which is attached to the walls of the jar by silk threads. The bottom of the egg-sac is approximately 5-6 mm. above the soil. Then the yellow coloured eggs are laid and the egg sac completed by weaving the saucer-shaped top. When disturbed the spider may destroy the egg-sac and the eggs; the destruction may be so complete that no traces of the web or eggs can be found.

The egg-sac is nursed for approximately 3-4 weeks by the spider and during this time the female is found either under the egg-sac lying on its back and holding the egg-sac up with its legs or holding it up from above. After approximately 3 weeks the spider either destroys the egg sac or the spiderlings hatch and start roaming about the jar. The hatching is dependent on the ambient temperature, temperatures of approximately 20°C. being required.

The newly hatched spiderlings soon dig themselves into the soil and make a small web around the hole; they darken quickly. Attempts to feed spiderlings with *Drosophila* did not give conclusive results. In view of the difficulty of feeding the young, the breeding of Funnel-web spiders in captivity is at present not practical.

The conditions under which the spiders were kept at these Laboratories may not have been ideal. Air conditioned and humidity controlled rooms are recommended. The soil in the jars rapidly becomes dirty, and the spiders must be frequently transferred to clean jars. Observation boxes may have advantages for the keeping of spiders, but safety measures are then more difficult.

The collection of the venom by teasing the spider and sucking up venom droplets from the tips of the fangs with a Pasteur pipette has a few disadvantages. The venom is easily contaminated, the spider may break off the tip of the pipette and finally, the danger of a spider bite is quite real when the laboratory technician tries to shake off the spider from the tip of the pipette and inadvertently pulls the pipette up too far. The application of electrodes to the chelicerae of an anaesthetized spider and the stimulation of the cheliceral muscles by means of a weak electric current (Bücherl, l.c.) is much to be preferred.

Our knowledge of the habits of these spiders in their natural surroundings is still poor and further observations are essential. Such studies may find an application if further investigation al work requires the keeping of a large number of *A. robustus* in captivity.

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Subscriptions Now Due

Membership fees and subscriptions to the *Naturalist* for 1964-65 were due for renewal by May 1. If you will not be paying your fees at one of the forthcoming general meetings, please remit them by post. Receipts will not be sent for payments by cheque unless requested.

This procedure will save office-bearers time, and expense, in sending out reminder notices.

Port Fairy Excursion, Easter, 1964

On Friday, March 27th, at 9 a.m., our party of twenty-nine Field Naturalists set off punctually in the bus for Port Fairy. At Eastern Beach, Geelong, we enjoyed morning tea in the bright sunshine which was to be with us for most of the next three days. Beyond Geelong we saw the Connewarre Lakes in the distance to the left. Approaching Colac, Lake Colac appeared on our right and views of Lakes Corangamite and Colongulac were obtained until we reached Camperdown. As we passed through the Stony Rises members recalled the stone fences which on a previous visit had extended for miles. Following recent road alignments and the consequent acquisitioning of property, one owner was insistent that his stone fence should be replaced in keeping with the rest! This was no easy task in days when the art has almost died out.

At Camperdown, leaving on our left Mt. Leura and the bare conical Mt. Sugarloaf with a regular spiral track winding to the top, we followed the road above the town to the caravan park and gardens. Here we were pleased to find shady trees on the sloping banks of Lake Bullenmerri, formerly considered a crater lake. This lake and the adjoining Lake Gnotuk are now believed to be formed by subsidence in volcanic tuff which was deposited beneath the sea. Marine fossils are found in the banks, and Lake Bullenmerri, being higher than Lake Gnotuk, drains into the latter which has no outlet and is therefore salt. From the beautifully kept gardens in the park the lakes could be seen separated by a ridge of land only a few hundred yards wide. The shore of Lake Gnotuk was encrusted with mineral deposits, while fishing boats on Lake Bullenmerri testified to its freshness. Lunch-time was spent on the banks of this lake after which the party, as it descended the hill to the town, enjoyed a panorama of some of the lakes that had been passed.

We called in briefly at Port Campbell, where bathers were happy on the beach, before continuing to London Bridge near Peterborough. Here a puncture was responsible for a longer stay. The beauty of the waves dashing against London Bridge in the afternoon sunlight and the blue sea tempted photographers. Some members of the party walked ahead studying the windswept vegetation by the roadside. In the half mile traversed before the bus overtook them, species of *Leptospermum*, *Correa*, *Calocephalus*, *Banksia*, *Leucopogon*, *Spinifex*, etc., were found, and later from the bus a group of grass-trees (*Xanthorrea*) was seen. Passing through Warrnambool we soon reached Port Fairy, to enjoy the well-cooked meal at Seacombe House and settle in comfortably during the evening.

Magpies carolling melodiously and joyfully as they always seem to do in the Western District woke us next morning. We met our leader, Miss Grace Bowker, an authority on the birds of this district, and set out for Killarney Beach and Roger's Bay, where, among other interesting features, an extensive kitchen midden behind the coastal sandhills held two dotterels' nests. Although there was plenty of seaweed there were few shells on the beach and the thousands of shells and white sand of the midden behind the yellow sand-dunes came as a surprise. *Spinifex* and stunted scrub abounded. The only flowers found in bloom were *Myosotis australis* (Austral Forget-Me-Not) and *Cakile maritima* (Sea Rocket). The latter was also found on a vacant allotment near Seacombe House, where both it and a small white *Convolvulus* (introduced) were flowering profusely.

In the afternoon we were met at Tower Hill, nine miles along the Princes Highway, by a party of Warrnambool Field Naturalists, including Messrs Martin Edge and Shirrefs, who handed us several typewritten pages describing the formation of this unique geological feature. It is a nested caldera about three miles across and ten miles in circumference, the central cone being surrounded by water and a basin-shaped "rim" of volcanic dust. The water has varied in depth over the years. I saw it in 1914 when there were cattle grazing and a fire burning on the bed of the almost dry lake. Since the floods of 1946 ample rains have replenished the supply and there is now sufficient water to prevent access by cattle to the cones. Owing to grazing in the past the native vegetation has almost disappeared and much of the land near the entrance has been

overgrown by African Box-thorn, thistles, Hemlock, etc. There are, however, some well-grown eucalypts, *E. ovata, viminalis* and *E. globulus* beside the road to the cones. The regular layers of volcanic dust forming "the rim" of the volcano and the border of "the largest hole in Victoria" are most striking. Interested public bodies, including the Warrnambool Field Naturalists, have planted over three thousand trees and plants occurring in the district, hoping to rehabilitate the native vegetation (see *Victorian Naturalist*, Nov., 1962).

In spite of the warm day several of our members climbed the central cone, 322 ft. above sea level, and were rewarded by the panoramic view. Others followed the road through the cones and discovered species of *Eucalyptus, Solanum, Epilobium, Olearia* and Elderberry still persisting in small quantities among the bracken. On the way home, on the Koroit side of the rim, six hawks were circling and through binoculars some pelicans were seen at the water's edge near one of the smaller cones.

That evening our party set out at 7.10 p.m. and walked along the causeway to Griffiths Island where Miss Bowker and Mr. Trevor Pescott, of Geelong, were to band Mutton-birds returning to the island rookeries. It was a mild moonlight night and, although we were shown a chick and saw some birds being banded, the "cloud" of returning parents was not as evident as it often is. Perhaps they had or had not heard that Field Naturalists were to be present!

Next day we visited "Allansford Bush" at Naringal, an area of several acres owned by Mr. R. Illidge of the Warrnambool Club, which is being kept in its native state. Messrs. Edge, Mathieson, and Shirreffs and others from the district accompanied us and at lunch time, tea and hot water were kindly supplied by Mrs. Halford, who showed us Maidenhair fern growing near the abour this reservation and said that he would be glad to direct to it any Field Naturalist who applied to him in Warrnambool. He was heartily thanked for his generous offer. We began to explore this delightful spot through which flows the Cudgee Creek sheltered by eucalypts *Leptospermum, Olearia, Helichrysum* and other natives. It was a happy hunting ground for the bird-lovers and botanists. Mr. Shirreffs occupied the attention of those who stayed behind by discoursing at length on the collection of geological specimens which he had brought. Special reference was made to "Australites" — small hard black glass objects of various shapes which arrived in a shower from outer space. These can be found at Stanhope Bay.

After travelling through miles of rich volcanic country which had been cleared for dairying, sheep, potato and onion growing, with occasional belts of shelter trees, pines, cypress and eucalypts, it was refreshing to find this little haven of natural bush. Bird-watchers were soon rewarded by the sight of a Powerful Owl and an eagle. A few botanists left behind by the bird-watchers consoled themselves very happily by studying the various species of daisy-bushes, *Helichrysum, Pomaderris*, Hazel, eucalypts, *Hypericum, Leptospermum*, Austral Mulberry, Austral Centaury, Austral Bear's Ear, Climbing Glycine (in flower) and the leaves of *Clematis aristata* and *C. microphylla*. The track led us to a dell at a bend of the creek where pockets of fern were thriving and the masses of *Blechnum, Doodia*, Tender Brake, etc., almost suggested that we were in the Dandenongs or the Otways.

On the way to Childers Cove a beautiful tall shrub of *Hakea suaveolens* (N.S.W.) was in full bloom by the roadside. An oil-rig was passed near the Cove where we walked along the cliff-tops. The scattered windswept growth among the rocks was littered with pockets of dead, bleached, so-called "Mediterranean Snails" which had been in evidence at most places along the coast. The cliffs are precipitous, allowing fine views of the blue ocean and the waves breaking below. We searched in vain for Australites here, but at Stanhope Bay one was found by Mr. Shirreffs. Fossils are present in the cliff face but the nearest approach to one found on the cliff-top was a piece of sandstone bearing the impression of a shell. At this point we overlooked a beautiful sandy cove. Some of our members enjoyed swimming and sunbathing; others explored the cliff, wandering through the scrub where the prevalent plants were *Spinifex, Leucopogon parviflorus, Rhagodia baccata, Mesembryanthemum australe*, and *Muehlenbeckia adpressa* (Lignum). Specimens of *Stackhousia spathulata* grew in small rounded masses as in a rockery. The furry white heads of the introduced *Lagurus ovatus* (Hares-tails) were common here as also on our other trips.

More Mutton-birds were banded during the evening. In all over sixty species of birds were observed by our party dur-

ing the three days. To Miss Barbara Primmer I am indebted for the following list:

Mutton-bird, Crested Tern, Silver Gull, Pied Oyster-catcher, Turnstone, Spur-winged Plover, Banded Plover, Red-capped Dotterel, Hooded Dotterel, Little Stint, Straw-necked Ibis, Spoonbill, White Egret, White-faced Heron, Black Swan, Mountain Duck, Grey Teal, Pied Cormorant, Gannet, Pelican, Swamp Harrier, Whistling Eagle, White-breasted Sea-eagle, Peregrine Falcon, Brown Hawk, Nankeen Kestrel, Powerful Owl, Black Cockatoo, Gang-gang, White Cockatoo, Galah, Crimson Rosella, Eastern Rosella, Kookaburra, Welcome Swallow, Grey Fantail, Rufous Fantail, Willie Wagtail, Black-faced Cuckoo-shrike, Striated Field-wren, Yellow-tailed Thornbill, Blue Wren, Magpie Lark (Mudlark), Grey Thrush, Golden Whistler, White-fronted Chat, White-backed Magpie, White-throated Tree-creeper, Silver-eye, Striated Pardalote, Mistletoe-bird, White-naped Honeyeater, Singing Honeyeater, White-eared Honeyeater, White-plumed Honeyeater, Yellow-winged Honeyeater, Noisy Miner, Australian Pipit, Goldfinch, Fire-tailed Finch, Starling and Raven.

On Monday morning, there were periods of light rain when the party set off for home in happy mood. The road led across the plains through Derinallum (passing Mt. Elephant), Lismore, Inverleigh, here crossing the Leigh River, a continuation of the Yarrowee Creek in Ballarat. Towards lunch-time rain set in heavily and the party was glad to complete the journey back to Melbourne in the shelter of the bus.

Our thanks are due to those members of the Warrnambool Field Naturalists Club, who were of such assistance on all our trips. We had spent four enjoyable days studying the natural features, vegetation and bird population of part of the Western District of Victoria.

—Eulalie Bennett.

Wildlife Research Foundation

The David G. Stead Wildlife Research Foundation of Australia, recently established with headquarters in Sydney, is an attempt to consolidate the nature conservation interests throughout the Commonwealth. The aims of the foundation as set out in its first circular are:—

To initiate, promote and further research, scientific, technical or other, into all aspects of the conservation of wildlife of the Commonwealth.

To maintain sanctuaries, reserves and to carry out experimental works.

To co-operate with organizations, universities and institutions in experiment or research in the use of national parks, playgrounds and similar areas; in the proper management, cultivation and preservation of Australian indigenous fauna and flora.

To publish information related to these aims and objects and to arrange lectures and carry on educational courses for the furtherance of these objects, and to establish fellowships and scholarships for work in conservation.

To establish and maintain museums, arboretums and collections related to its objects.

The Foundation has received a gift of 66 acres of land at Bargo on the southern tablelands of New South Wales and is in process of erecting an office building there. Plans for a Ranger-Manager's residence are in preparation. The area is named "Wirrimbirra", a local native name meaning "to preserve". The Foundation also has in course of preparation a booklet showing the protected species of New South Wales flora in colour. It would like to follow this with one on Victoria and then the other States.

MEMBERSHIP is open to individuals or organizations subscribing to its aims. Fees: Individuals £1/1/-; Organizations £10/10/- per year, payable on January 1. Application forms for membership and further information are available from Box 2307, G.P.O. Sydney, N.S.W.

—Mrs. Thistle G. Stead

Some Observations on Orchids

By J. R. GARNET

At least one species of greenhood emits an odour. Those who find it difficult, because of the very small size of the flowers, to distinguish the Midget Greenhood (*Pterostylis mutica*) from the Swan Greenhood (*P. cycnocephala*), should be able to recognize the former by the rather foetid odour of its flowers. In my experience the Midget Greenhood is the only species of the large genus *Pterostylis* which emits a scent of any kind.

Flowers of the handsome sun-orchid, *Thelymitra grandiflora*, emit an orange- or lemon-flower scent—a delightful perfume but one which is apparent for only a few minutes. Its rival in size and beauty, *Thelymitra media*, does the same thing but, by way of contrast, its "perfume" resembles that of a wet dog. Unattractive as that is to human senses, it draws certain native bees as if by magic. On a warm sunny day, between 10 a.m. and noon, the odour is in the air and the bees are on the wing. Each visitor is likely to leave the flower with a load of sun-orchid pollen attached to its back. The chances are that it will be relieved of its burden when it visits another flower. The little bee will position itself on the labellum in such a way that pollen is deposited unerringly on the sticky mass of the stigma.

Our native bees appear to be very discriminating where odours are concerned. Cinnamon Bells (*Gastrodia sesamoides*) is not generally regarded as a scented orchid but it too, like the two sun-orchids, has its moments of allure. Some kind of stimulus —it might be warmth, humidity, sunlight, or a combination of factors—causes its flowers to emit a very powerful orange-flower scent, which brings a small reddish-brown halictine bee whizzing in from afar. The scent endures for only a few minutes, as though a lid were opened and then shut. Fertilization of the flower is the consequence of the visit by the bee.

* * *

Helmet-orchids (*Corybas*) are notable for the extent to which their flower stalks elongate after the flower has been pollinated and the seed set. The accepted explanation for this phenomenon is that it ensures disposal of the seeds when they are released from the seed capsule. In *Corybas* there is a single small flower that is not more than an inch or so above the little saucer-like leaf which rests flat on the ground. If the seeds were freed from that level, they would not get far. However, by the time the seed capsule has ripened, it might be anything up to a foot above its original position. As the minute seeds drop out, they are caught in air currents and taken to places far from the parent plant.

In bird-orchids (*Chiloglottis*)

exactly the same thing happens. The Broad-lipped Bird-orchid (*C. trapeziformis*) flowers in spring. The little "bird" sits on top of a stalk about five or six inches in height. Out of curiosity, I once pollinated a flower and then watched its progress. Within two days the sepals and petals had folded up and the ovary was swollen. At the end of a month the seeds had ripened. But by that time, the stalk had increased in length from six to ten inches. The seeds were duly wafted away, but the stalk kept on lengthening. At the end of two months it was fifteen inches long. The additional five inches of growth was so much wasted effort, for there were no seeds left in the capsule. The flower of the companion plant from which I had removed pollen, remained open for six weeks. It was not fertilized and its flower stalk did not increase in length. It simply withered slowly.

* * *

I can conceive of no explanation for an odd phenomenon which can be observed in the little autumn-flowering leek-orchids or "midge-orchids"—those species in the section *Micranthum* of the genus *Prasophyllum*. Several of these grow not far from Melbourne; or rather, they used to do so. The flowering plants are slender little things, only a few inches high, comprising a stem and a single, terminal, cylindrical leaf. The spike of tiny flowers emerges from a lateral slit, somewhere near the end of the leaf. Should the spike happen to emerge at the very apex, then the plant seems to be without a leaf. However, it can get along quite well without one, as was demonstrated in the following way.

Some years ago, when I was studying the pollination of several of these autumn prasophylls, I had a number of plants of different species growing in pots. On many occasions, while they were in full bloom, I cut the plant off at ground level, either to press it or to dissect the flowers. This ruthless action

Left:
Prasophyllum morrisii

Centre:
P. despectans

Right:
P. walveri

Photos: H. T. Reeves

never affected the vigour of the plant the following year. The new tuber, forming at flowering time, continued to develop, and it was able to do so because the old tuber held sufficient food reserve to allow the stump of the stem to grow. The new growth continued until there was a new stem, quite often much longer than the original flowering plant. These orchids (*Prasophyllum despectans, P. archeri, P. morrisii, P. nigricans, P. fuscoviride* and others), although practically leafless, are not holosaprophytes as are Cinnamon Bells and Hyacinth Orchid (*Dipodium punctatum*). They are much like most of our terrestrial orchids, perennials which depend on the replacement of an underground tuber. There is a small root system and some photosynthetic tissue. In the autumn-flowering prasophylls, the stem contains chlorophyll and it shares the function of the leaf.

Bush Brushes

The fox's brush was the traditional trophy of the chase. The Field Naturalist usually returns from an excursion into the bush with a different sort of "tale". If you have one worth mounting and preserving send it to the Assistant Editor, "Victorian Naturalist", 102 Murray Road, East Preston, N.18, Victoria.

Monarch Butterfly:

This nature note comes to us from Mr. Victor Jacobs, a teacher at Doveton West State School.

During February last, a pupil, Susan Wah, came to school with a twig of Swan Plant *Asclepias sp.*, bearing a chrysalis. This roughly cylindrical chrysalis was a thing of rare beauty. About an inch long, it was bluntly pointed at the bottom and the top was a shallow dome. Its general colouration was a delicate green while the margin between the dome and the sides was delineated with dots of highly-polished gold. More similar dots patterned the faint lines that indicated the future wings.

While the specimen was being displayed, a small boy came into the room with a cardboard box which he opened to display a handsome orange and black butterfly. Two names came to mind for this animal and rather than be in error I consulted Leach's *Australian Nature Studies* and found that both had a place in its identification. It was a Monarch Butterfly, *Danaida plexippus*, commonly known in Australia as a Wanderer. The latter name is quite apt as the species began to extend its American habitat in the latter half of the nineteenth century, reaching Australia in the early 1870's.

The small boy departed and a child in my room remarked that he had seen pictures of that butterfly in a library book. When the book was found and the right page turned, not only the butterfly presented itself but also the Monarch's chrysalis, identical in shape to the one in my hand but differing in its colour. The thought occurred that it might have recently pupated but Susan could not help us to find that detail.

Next morning a dozen pairs of hands shot up when we came in after morning assembly to tell me of a change in the chrysalis. Its delightful pastel shade had darkened to a medium brown while the area of the wings was a deep purple. This proved that pupation must have been recent and we looked forward to the next stage in the life cycle.

To everyone's surprise, this arrived very soon, for when we came in after morning recess, a rather limp imago was hanging on the transparent, empty chrysalis. In those few minutes we had missed the expansion of the wings but I was able to demonstrate the limpness of the wings by gently folding them with a pencil to form a narrow u-shape and then dropping them again. The butterfly flew at midday the same day and I had viewed with 40 eager witnesses a more rapid metamorphosis than I had previously believed existed. I am keen to hear from readers if they have experienced similar occurrences and whether this is the regular behaviour of this species or not.

The Monarch Butterfly has now practically become a cosmopolitan member of its family, but breeding is restricted to areas where the larval food plants, *Asclepias* and *Gomphocarpus* are found.

The duration of the pupal stage varies in different species of butterfly and in temperate climates some species pass the winter in this stage. The emergence of the adult may be influenced by the weather. In the tropics, after a long dry spell, many species appear shortly after the onset of the rainy season.

During pupation most of the larval tissues suffer auto-digestion and the resultant products are then utilized by groups of intact cells called the imaginal discs in the formation of the adult tissues. Whilst this is happening pupae frequently have a protective colouration. Towards the end of the pupal stage the colours of the adult

begin to appear through the pupal skin and in those species in which the whole pupal stage is short, the change comes in a very short time before the emergence

The "dots of highly-polished gold" mentioned above are the basis for the name "chrysalis"

—R. H. J. McQ.

Onion Orchids:

The following interesting note has been sent for these columns by Ellis Tucker, of Brit Brit, via Coleraine.

I wish to record the rediscovery in Victoria and an extension of habitat for the Onion Orchid *Microtis orbicularis*, to the Victorian Range in the Grampians.

This orchid was found in large numbers, growing in association with *Microtis unifolia*, in a swamp near Woohlpooer during early November last year.

The species had previously been collected in only two Victorian districts — Wonthaggi (several specimens between 1930 and 1934) and Gorae West (between 1936 and 1942).

Mr. A. C. Beauglehole, who collected the specimens at Gorae West, tells me that the swamp in which they grew has since been drained and cultivated. Consequently the orchids are no longer known in that area. As no collection of the species has been recorded from Wonthaggi since 1934, it seems that the Woohlpooer swamp colony may be the sole survivors of this orchid in Victoria.

Purple Helmet Orchid:

Another note concerning the distribution of an orchid species comes to us in the following observations from Mr. David Woodruff.

The Purple Helmet Orchid *Corybas diemenicus*, is found across most of southern Victoria. In late August, 1963, it was found to be abundant on the coastal dunes between Tidal River and Mount Oberon at Wilson's Promontory. J. H. Willis, in his *Handbook to Plants in Victoria, Vol 1*, records both the Fringed Helmet Orchid *C. fimbriatus*, and the Veined Helmet Orchid *C. dilatatus*, from the National Park, but there is no apparent record of *C. diemenicus* from south of Yarram. Thus this record constitutes a logical extension to the known distribution of the species.

C. diemenicus differs from *C. fimbriatus* in that the margin of the labellum is only finely toothed and from *C. dilatatus* in having a shorter, broad ovary.

The orchids were found growing in groups of up to ten individuals beneath the Coastal Tea-Tree *Leptospermum laevigatum*. Also flowering at that time in the same habitat were *C. fimbriatus*, Gnat Orchid *Acianthus reniformis*, Striped Greenhood *Pterostylis alata*, and in the sunnier locations on the higher parts of the dunes, Banded Greenhood *P. vittata*. The large prostrate leaf of the Red-beaked Orchid *Lyperanthus nigricans* was noted, but this species was not seen in flower until early September.

Bees in Bluebells

This note comes from Mr A. J. Swaby, and it refers to an item in the *Victorian Naturalist* (Vol. 80, pp. 296-97) of January 1964:

Dr. Margaret Chattaway's note on temperatures in flowers calls up memories more than 70 years old. Close to our home, acres of bluebells, almost certainly *Wahlenbergia bicolor*, flowered for months. In many of the flowers, small black bees snuggled close. We thought they were sleeping. Later, the theory was that they were sheltering from the cold. But they were there after many hours of sunshine and still torpid

Could it be that the flowers had some special attraction for the bees? We found them in no other flowers. How far had the flowers developed? Were the bees intoxicated? Would they wake, say, when the pollen was ready? Stamens ripen first and are shed or withered before the stigma pushes up.

Country members might find interest in following that up. I left the area early and have never since been in the country for continued observation.

Initials:

Would all contributors to these columns please use their full names and not initials when signing articles for publication.

— R. H. J. McQ.

Field Naturalists Club of Victoria

Eighty-fourth Annual Report, 1963-64

The steady development of previous years continues. Membership continues to grow and with it the circulation of the "Naturalist". Ordinary membership is now 543 (last year 504), Country 324 (325), Junior 49 (45) and Honorary and Life Members remained 27— a total of 942 (901).

Following his assumption of office as Governor, Sir Rohan Delacombe has kindly agreed to accept the position of patron of the Club

During the year honorary membership was conferred on Messrs. D. E. McInnes and W. C. Woollard, in recognition of their good work in launching the Club microscope.

An unusual event was the marriage of the President while in office. Members united to wish Mr. and Mrs. Houghton all the best in their new life, and a wedding gift was tendered to them at the general meeting before their wedding.

As is to be expected, in a Club the size of ours, we lost several valued members by death, notably Messrs. H. P. Dickin, Charles Gabriel and H. T. Reeves.

Distribution of "Victorian Naturalist". Besides those sent to members and subscribers, free or exchange copies are distributed both in Australia and to most overseas countries. About 40 copies per month are sold through Melbourne book shops. The total monthly circulation of the "Naturalist" is now just in excess of 1,100 copies, showing very little change during the year under review, so it appears that the circulation is becoming stabilized after the spectacular increase which occurred, due to the introduction of the new format from the total of 590 copies per month in April, 1959. This may not be a good thing, and perhaps the time is ripe for another membership drive.

Editor. For much of this increase in membership and circulation we must thank the energy, vision and initiative of Mr. N. A. Wakefield. It is with great regret that we must report that he has found it necessary to resign his post as editor. Fortunately, Mr. J. R. Hudson was able to take over the office as from the beginning of the year 1964-1965 (volume 81).

Librarian. During the year our energetic Librarian, Miss M. E. Argo, let it be known that she wished to retire if a successor could be found. Mr. Kelly having expressed willingness to accept the position, Miss Argo was not nominated for the coming year. Her enthusiasm and sheer hard work have made a vast difference to the Library, and the Club is indebted to her for all she has done.

Show. Our Annual Show, in September 1963, was again very successful, there being a good attendance, of whom several applied for and were granted membership in the Club. Once again the Society for Growing Australian Plants joined us in staging the show. Profits were about £150, of which £50 was donated to the S.G.A.P. We look forward to another successful effort next September.

Fauna and Flora Protection. The proper function and the adequacy of our parks and reserves is a perennial subject for consideration. We have been watching the position at Wilson's Promontory with great concern, and hope things do not turn out as badly as we fear. The conference recently called by the Victorian National Parks Association fell outside the year under review.

Among wild-life protection matters considered by the Club the following have led us to take action.

1080. Stirred by the persistent reports of loss of farm stock and native animals, we have requested the Lands Department to try and find some less dangerous rabbit poison.

Shallow Lakes. The Water Supply Commission is planning to conserve water by deepening some lakes in Northern Victoria and eliminating others, thus reducing evaporation. This, of course, will adversely affect waterbirds, and we have drawn attention to this aspect of the scheme

Sherbrooke Lyrebirds. This is a question of properly policing the adequate regulations and we continue to press for patrolling of the park at all times.

Logging Practices. After seeing slides of damage done by saw-millers in the Mansfield district, we wrote to the

Forests Commission protesting about the practices apparently adopted. Only a formal reply has been received.

Miscellaneous. We have contributed to the "Elsa" Fund for animal conservation in East Africa and to the David Stead Memorial Foundation. We also investigated the accidental destruction of a nest of the Helmeted Honeyeater by a team engaged in spraying blackberries, and a report in "Truth" of casualties among penguins on Phillip Island.

After the return of the Club excursion to Western Australia, we wrote to the Premier of that State, urging the need for conservation of wildlife, especially plants, and were assured that his government is alive to this need and is taking steps to meet it.

We objected to the proposal to establish a Clay Target range in the Plenty River Gorge. Permission to erect the range has been refused.

Accommodation. While we are very grateful to the Herbarium authorities for excellent accommodation for meetings and space for a library we are only too well aware that we have no security of tenure. A notice that the inner room will not be available for meetings in the New Year has led us to take stock of our position and to consider whether we cannot acquire a home of our own. During the year Miss Allender had to ask us to remove our stock of back numbers of the "Naturalist" from her house. Miss Elder made hers available, but that, too, was sold, and we had to move again. Finally Miss McLaren made her garage available for a nominal rental.

Medallion. The Natural History Medallion for 1962 was awarded during the year to Mr. N. A. Wakefield, and presented to him by Mr. A. D. Butcher, Director of Fisheries and Wildlife. The award for 1963 has just been announced. Mrs Stead (Thistle Harris) is the recipient.

Lectures. We must again thank those members and non-members who have entertained and instructed us during the year on a wide variety of subjects.

McCoy Grave. For many years the Club has accepted responsibility for the grave of our first President, Professor McCoy. This year we have had it covered with a concrete slab, which should keep it tidy for a long time.

Club Microscope. Orders for over 100 complete microscopes and for 10 tubes for members to make up their own have been received.

Excursions. This year has been very successful for excursions. The most ambitious was a three weeks' excursion to Western Australia in September. Twenty-six members left Melbourne in a chartered parlour coach, travelling via Murray Bridge, Port Augusta, Port Lincoln, Ceduna, Norseman, Esperance, Albany, Pemberton, Perth and Southern Cross to Kalgoorlie, from whence the party returned to Melbourne by train. The trip was a combination of accommodation and camping. The winter had been wetter than usual and members were delighted by the number of wildflowers and by the growth along the Eyre Highway, which made the travel almost dust-free. Interest was shown in the blowholes and an aboriginal camp-site, which had just been vacated, showing where hollows had been scooped out for the sleepers and long, narrow fires lit between them. The coach travelled 3,665 miles between Melbourne and Kalgoorlie, and the train back added another 1,800 miles to the journey.

Another extended excursion was to Mount Buller, between Christmas and New Year. This included day trips to Paradise Falls and the Howqua River.

Easter was spent at Port Fairy, where Miss Bowker, Miss Brady and members of the Warrnambool F.N.C. acted as hosts and took the party to Killarney Beach, Tower Hill, Allansford Bush, Stanhope Bay and other places nearby.

The usual day excursions were held on the third Sunday in each month, the places visited being the Yuu Yangs, King's Falls, Coimadai, Blackwood, Gembrook, Wonga Park, Mandurang-Sedgwick with the Bendigo F.N.C., Point Leo with members of the Frankston F.N.C., Lake Mountain, Point Addis with the Geelong F.N.C., Kinglake and Mount William. In addition there was the President's picnic on Cup Day to the Hume Ranges, and various excursions arranged by the groups.

Groups

Marine Biology and Entomology. Attendance at the Group Meetings is still being maintained, if anything it shows a slight increase.

Over the past year the Group has had three guest speakers, and it is hoped that this year we will be fortunate enough to obtain at least three more.

Many members of this Group have given most interesting and instructive lectures on some phase of Marine

Biology or Entomology.

Members bring to the meetings many specimens; for identification, in some cases, but in others, they have given interesting talks on their exhibits.

The Group has held two field days over the past year, and it is felt that we should have more of these.

We are very much indebted to Mr Dan McInnes for bringing along Club microscopes to each meeting and specimens to show and discuss.

The Group is looking forward to an interesting and instructive 1964-65.

Geology: Attendance figures for the year were satisfactory, showing an increase, with an average of twenty-four at each meeting.

The lectures covered a wide field of both popular and scientific nature, from Earthquakes to Polarized Light. Particular emphasis was made upon Group discussions, so that all members could take part. During the year it was most gratifying to see so many of the newer members taking part in the activities of the Group. Under the guidance of Mrs. Salau and Messrs. Sault and Hemmy, a well-arranged exhibit on the Building Stones of Victoria was staged at the last Nature Show. Mr. R. Davidson visited the Portland and Bendigo Clubs, to lecture on Gemstones, and stimulate an interest in Geology. Assistance was also given to the Scout movement with their annual shield competition.

Field work consisted of a series of excursions commencing with two for beginners to Royal Park and the National Museum. Other areas visited included Gisborne, Lancefield and Narre Warren. Leaders were also supplied for general club excursions to Werribee Gorge, Trentham and Lancefield.

A summary of the year's work indicates a scientific approach to the subject with all members benefiting, which augurs well for the future.

Botany: Average attendance at meetings this past year has been 23, and interest and activity generally are on the increase. Programmes have been broad and varied, and have ranged through plant groups, both classificatory and environmental, including aspects of physiology, geology and climate.

Regular group members have participated in lectures as well as in members' night features and in the several slide features in the flower-of-the-month series.

Excursions have been held to the following places — Cranbourne, Cheltenham, Fernfree Gully, Maranoa Gardens, Tallarook, Yellingbo, Kinglake, Kalorama Arboretum and Sherbrooke.

Following the decision last year to institute a slide library, this innovation got away to a good start in July with the gift of 73 slides by Mrs. Z. Lee. Mr. M. Houghton also has been a contributor since this date. The book committee has been instrumental in recommending several texts for the club library.

The Nature Show exhibit last September displayed "Acacias" and was successful in arousing a great deal of interest. Immediately after the Show the group got right down to organising for this year's display on "Conifers". All energies are now bent on preparation for the coming Nature Show.

(The reports on activities in the Library and of the Fauna Survey and Microscopical Groups were received too late for inclusion in this issue and will appear in the next issue.—Editor.)

FIELD NATURALISTS CLUB OF VICTORIA

GENERAL ACCOUNT

STATEMENT OF RECEIPTS AND PAYMENTS FOR 12 MONTHS ENDED 30th APRIL, 1964

(Figures adjusted to nearest £1)

Receipts			Payments			
Subscriptions Received —			Victorian Naturalist —			
Arrears	£38		Printing	£1,773		
Current	1,663		Less from Ingram Trust Grant	67		
Supporting Members	90				£1,706	
		£1,791	Illustrating	£344		
Sales of Victorian Naturalist		188	Less from Ingram Trust Grant	141		
Advertisements in Victorian Naturalist		216			203	
Interest Received —			Despatching		172	
Library Fund	3		Editorial Expenses		25	
Bank Account	42					£2,106
		45	Working Expenses —			
Surplus from Excursions		118	Postage and Telephone		£73	
Sale of Club Badges		14	Printing and Stationery		65	
Moomba Committee, refund of advances and share of surplus		55	Library Expenses		18	
Amount transferred from Building Fund Account for payment of rent		54	General Expenses		33	
			Donations, Subscriptions and Affiliation Fees		20	
			Typing and Clerical Assistance		78	
			Fauna Group		12	
			Natural History Medallion		12	
					£311	
			Less Ingram Trust Grant on account of Fauna Group		12	
						299
			Rent of Hall and Library			54
						£2,459
			Surplus for the year			22
		£2,481				£2,481

FIELD NATURALISTS CLUB OF VICTORIA

BUILDING FUND

Amount of Fund at April 30, 1963	£1,572
Interest on Investments and from Bank Account	72
Gain on Maturity of M.M.B.W. Stock	10
	£1,654
Less amount transferred to General Account for payment of Rent	63
Amount of Fund at April 30, 1964, as per Balance Sheet	£1,591

PUBLICATIONS FUND

Amount of Fund at April 30, 1963	£1,481
Surplus for year from—	
Ferns of Victoria	12
Victorian Toadstools and Mushrooms	8
Other Publications	6
Interest on Special Bonds and on Bank Account	47
Amount of Fund at April 30, 1964, as per Balance Sheet	£1,554

CLUB IMPROVEMENT ACCOUNT

Amount of Account at April 30, 1963	99
Commission earned on sale of Books at Meetings and Shows	16
	£115
Cost of binding periodicals in Library and procuring missing numbers	£75
Amount of Account at April 30, 1964, as per Balance Sheet	£40

FIELD NATURALISTS CLUB OF VICTORIA

BALANCE SHEET AS AT APRIL 30, 1964

(Figures adjusted to nearest £1)

Liabilities

Year 1962-63				
£381	Subscriptions paid in Advance			£401
11	Sundry Creditors			34
365	Members' deposits, Perth Trip			—
80	M. A. Ingram Trust Grant, amount in hand			—
	Special Funds and Accounts—			
1,572	Building Fund		£1,591	
1,481	Publications Fund		1,554	
50	Library Fund		50	
99	Club Improvement Account		40	
100	Excursion Account		100	
	Estate Marion Wright—			
200	Amount of Legacy	£2,608		
—	Interest in Hand	80		
			2,688	
	Microscope Project Account		167	
				6,190
2,026	Surplus of Assets over Liabilities			2,049
£6,365				£8,674

I report that in my opinion the accompanying Balance Sheet and Accounts are properly drawn up in accordance with the provisions of the Companies Act 1961 and so as to give a true and fair view of the state of the Club's affairs. Also that the accounting and other records examined by me are properly kept in accordance with the provisions of the Act.

W. P. J. Evans
Hon. Auditor

Assets

Year 1962-63				
	Current Assets—			
£1,230	Bank Current A/c and Petty Cash	£217		
	Special Bonds in course of repayment	300		
76	Sundry Debtors	222		
30	Arrears of Subscriptions, estimated	30		
48	Badges on Hand, at cost	33		
42	Books on Hand for Sale, at cost	51		
78	Microscope Project Stock, at cost	203		
				£1,056
1,738	Library, Furniture and Equipment, at cost			1,803
	Investments of Funds—			
	Building Fund—			
950	Commonwealth Bonds at cost	£1,050		
420	S.E.C. Stock at cost	420		
90	M.M.B.W. Stock at cost	—		
112	E.S. & A. Bank, No. 2 Account	121		
				1,591
	Publications Fund—			
900	Commonwealth Bonds at cost	£600		
	Stocks valued at cost—			
311	Victorian Ferns	285		
35	Victorian Toadstools	615		
—	Sundry Debtors	26		
235	E.S. & A. Bank, No. 3 Account	28		
				1,554
	Library Fund—			
50	Commonwealth Bonds at cost			50
	Legacy, Estate Marion Wright—			
—	Commonwealth Bonds at cost			2,600
20	Cosstick Reserve, Maryborough, at cost			20
£6,365				£8,674

Field Naturalists Club of Victoria

General Meeting—May, 1964

After the meeting, which was attended by about 120 members, had been opened by the President, Mr. M. K. Houghton, Mr. E. H. Coghill made a number of announcements. He mentioned that arrangements for the Nature Show to be held in September were going ahead and he reported receipt of a copy of the Geelong Field Naturalists' Club's new production, the *Geelong Naturalist*, which would appear four times a year and cost 2/- per copy. Mr. Coghill said that not only was this Club to be congratulated on its publication, but also on the printed programme of meetings and excursions for 1964-65. He regretted having to report the resignation of Mr. Colin Lewis from the Secretaryship of the Natural History Medallion Committee and called for a volunteer to replace him. A volunteer was also required to undertake the distribution of copies of the *Victorian Naturalist* to booksellers in Melbourne and to collect unsold copies.

The President referred to the discussion in the Lower Glenelg and Heytesbury areas at the April meeting and said that the National Parks Association had arranged a Conservation Conference in the Herbarium on May 30th. Mr. R. Garnet explained that there would be three sessions with speakers such as Professor Turner and Mr. Frances Ratcliffe and a number of important resolutions would be put to the meeting. He hoped that the F.N.C.V. would be well represented. The President mentioned that he understood that the N.S.W. Minister of Lands had agreed to the construction of a motel and drive-in on a Broken Hill Regeneration Area. These belts had been planted and maintained for many years to protect the population from dust-storms, but the protests of responsible individuals had been rejected.

The subject for the evening was Members' Night—Mount Buller. Mr. Peter Kelly and Miss Jean Woollard gave an interesting commentary on a fine collection of colour slides that had been taken by members who went on the trip. The party had stayed at a chalet in the ski village from which excursions had been made to the summit of Mt. Buller, to Paradise Falls, to Little Buller, to Mt Stirling and to the Howqua River Valley. The slides included some excellent shots of nearby and distant peaks, of local features and of the alpine flora. Composites were well represented amongst the flowers and one of the finest was the Cascade Everlasting. It is not possible even to list here the species of *Stylidium*, *Veronica*, *Prostanthera*, *Dodonea*, etc., illustrated. The speakers and members who lent their slides were thanked by the President.

The new members listed on page 27 of the May *Naturalist* were elected.

Among the exhibits was a collection of rocks from Mt. Buller to which Mr. Bruce Jones spoke. These included basalt, granodiorite, conglomerate, gritty and palaeozoic sandstone, hornfels and schist. Under a number of F.N.C.V. microscopes Mr. Woollard showed sections of some of these rocks and also the flower of *Laurentia petraea*. Mr. Swaby explained a colour slide of *Laurentia axillaris*, pointing out how a dab of pollen was put on the insect visitor's forehead. Miss Woollard had set up a microscope slide with transverse sections of *Ritchea* root and stem. Mr. McInnes had brought a number of limestone pebbles from Beaumaris to show the holes made by the polychaetic worm, *Polydora ciliata*.

Mrs. Bennett displayed a colour slide of the Heytesbury Forest area to illustrate her account of the activity of bulldozers given at the April meeting. She drew attention to the error in the report on page 24 of the *Naturalist*: the number of acres involved was 70,000 and not 7,000. Mr. Coghill exhibited a female mouse spider and Mr. Swarbreck mentioned the great difference in size and appearance between the two sexes in this species. The females appear to be not uncommon in drier areas but the males are rarely seen. Another arthropod on view was a Hairy Cicada, *Tettigarcta crinita*, from Kalorama, brought by Mr. R. Condron. Under "What is it?" Miss Dickson had a fungus that was tentatively identified as *Pholiota speciabilis*.

Other exhibits included specimens of Lilydale limestone containing Devonian fossils, lamp-shell, etc.; Victoria's largest cowry, dredged in Bass Strait, and fossil remains from Balcombe Bay. Mr. Peter Kelly had produced a map of the Mt. Buller area

Geology Group—May 6, 1964

Twenty-eight members and visitors were present with Mr. L. Angior in the Chair. Mr. R. Davidson reported on the week-end excursion to Bendigo and Heathcote on April 18 and 19. On the Saturday evening, Mr. Davidson had given an address on "Gemstones" to the Bendigo Field Naturalists' Club. On the Sunday, Mr. F. Robbins of Bendigo had led an excursion to Heathcote, first visiting the Eppalock Weir, where the Power-house was inspected. Glacial pavements, large erratics and tillite beds in the vicinity of Heathcote were examined and many photographs taken. As the best of the pavements are being obliterated by the water of the weir, the group had considered suggestions for their preservation.

Mr. R. Hemmy gave a short account of the Clubs' excursion to the Aboriginal Quarries at Mt. William. A letter was received from Mr. Neville Pennington, of Rob Roy, N.S.W., stating that he had been fossil collecting with Mr. and Mrs. Cheslin. Suggestions were considered for the Group's exhibit at the next Nature Show. Arrangements were also made for the Group to compile a taped commentary with slides for use by any interested country clubs.

The subject for the evening took the form of "General Topics and Specimens" by members. Master R. Whatmough opened the proceedings with a comprehensive collection of photographs of the Bendigo excursion. Mr. J. Miller explained specimens from Central Australia, including asbestos from Wittenoom Gorge, concretions in limestone, ironstone concretions and banded jasper, all supplied by Mr. Sorrell, a visitor from Poowong. Mr. R. Hemmy exhibited red jasper from Waratah Bay and Mr. Davidson gold sheen obsidian, crazy lace agate, wonder-stone, petrified and polished palmwood and dinosaur bone, royal purple agate, silver onyx, jadeite and petrified whale bone.

All these had been presented by Col. Hunter, a collector from California. Mr. Davidson also advised that a specimen collected by him at Kitty Miller Bay, Phillip Island, had been accepted by Dr Beasley for the Museum collection. Other specimens displayed were by Mr. A. Cobbett, kidney ore (haematite), pyrite crystals, rubellite, tourmaline, topaz, marcasite, gypsum and arsenopyrite; by Mr. L. Angior, imperial porphory, basalt from Cairo and alabaster; by Mrs. Salau, gneiss with felspar. Mr. L. Sault showed slides of a cave in the limestone at Cape Schank, columnar jointing in basalt, arragonite, concretions in basalt; from Heathcote, Dunn's Rock, erratic (Stranger Rock), microgranite. Mr. R. Dodds completed the evening with a brief account of a holiday visit to Tasmania. Discussion took place on each of the exhibits with explanations of the identification

Marine Biology and Entomology—May 4, 1964

Fifteen members attended the meeting which was presided over by Mr. R. Condron. The President advised that this was the date on which nominations for group officers for the ensuing year were received. Mr. J. Strong was nominated, in his absence, as Secretary, and it was unanimously decided that Mr. R. Condron and Mr. J. Strong continue as the group's President and Secretary respectfully

Mr. D. McInnes then presented a sketch of the proposed beach scene for the nature show later in the year. He advised members that assistance was required from each one in order to carry out this project. Members were urged to make individual displays as it was expected that more space would be available this year. Mr. R. Condron suggested that an exhibit of aquatic insects and termites would prove interesting.

The subject for the evening was "Polychaete Worms", and the address was given by Mr. D. McInnes, who is busily engaged at present studying these worms.

Members' interest was held throughout the evening by this interesting subject. The speaker used monochrome transparencies of illustrations from text books on the subject. These were interspersed with colour transparencies of some worms taken on a Group outing to Phillip Island. At the close of the lecture Mrs. Z. Lee showed some slides from other States that had been sent to Melbourne for a nature competition.

Exhibits:

Mrs. McInnes showed a small fly (unidentified) and some small pointed shell snails.

Mr. R. Condron showed a pair of crane-flies caught at Croydon, and a collection of various insects that had been trapped inside a light. It was decided that the group would visit Mrs. Lee's property at Gembrook just prior to the nature show to look for exhibits.

Geelong Field Naturalists Club

The Geelong Field Naturalists Club continues to forge ahead. The third annual report is included in Vol. 1, No. 1, of its new journal, the "Geelong Naturalist". This is a roneod 24-page quarterly, price 2/- per copy, most attractively prepared.

We also have copies of the Club's syllabus of meetings and excursions till April, 1965.

Mr. I. Prescott is *President*.

Miss. V. Boardman, *Honorary Secretary* (262a Latrobe Terrace, Geelong).

Mr. D. MacKenzie, *Editor* (16 Lascelles Avenue, Manifold Heights, Geelong).

Australian Institute of Aboriginal Studies

The Australian Institute of Aboriginal Studies is a body set up by the Commonwealth Government to record basic knowledge before it is irretrievably lost. It has invited the help of members of the F.N.C.V. in the collection of information about Aboriginals.

The kind of information desired includes:

1. Names and addresses of Aboriginals or part-Aboriginals in your area, together with any available details of their knowledge of tribal language or lore.
2. Information on the Aboriginal history of your area.
3. Names and addresses of any white people in your area who may have any special knowledge of Aboriginals.
4. Names and addresses of any societies or groups in your area who might be willing to assist them.
5. Identification of any Aboriginal sites in your area — carvings, paintings, cave deposits, middens, ceremonial grounds, burial grounds, etc.
6. Information as to any collections of Aboriginal implements in your area.
7. Information as to any manuscripts, photographs, or pictures in your area dealing with Aboriginals, and information as to the old homesteads or other places where these things are likely to be found.
8. Any material relating to Aboriginal songs, music or ceremonies in your area.
9. Any information as to languages or customs of past or present Aboriginals in your area.

The above list is not necessarily complete, but will indicate the general field of the enquiries. Even apparently disconnected scraps of information may be valuable. Information should be sent direct to:

The Australian Institute of Aboriginal Studies,
Box 553, City P.O.,
Canberra, A.C.T.

Book Review:

The Gum Trees of the Australian Capital Territory

By NANCY T. BURBIDGE

There is a deplorable deficiency in Australia of literature bearing on local natural history—e.g. geological formations, district plant-life, bird lists, guides to butterflies, beetles and other insects. This situation stands in sharp contrast against the wealth of information readily available to naturalists in Britain, where almost every county has its published flora. When one is constantly asked the question, "Where can I get an account of the wildflowers around so-and-so?—we are holidaying there next week", it is frustrating to have to reply: "Sorry, but there isn't any" or "You'll need to consult an article in the *Victorian Naturalist* of May 1898". Botanists and lovers of our native plants welcomed Dr Nancy Burbidge's *Wattles of the Australian Capital Territory*, published in 1961, a 16-leaved booklet replete with simple key, habit notes and bold line drawings for all the 20 *Acacia* species indigenous to or naturalized in the A.C.T.

At the close of 1963 Dr Burbidge brought out a companion book on the Territory's eucalypts ("gum trees"), which will surely prove as popular as its predecessor. The present work, in smaller type, is also considerably larger. It embraces 20 pages of text and 12 beautiful full-page reproductions of photographs by Colin Totterdell, the latter portraying a selection of species in their natural habitat. The key to 36 species is embellished by clear marginal sketches of buds and fruits—as in W. E. Blackall's *How to know Western Australian Wildflowers*. While congratulating the authoress, and expressing gratitude for her very worthy contributions to regional plant-lore, may we hope that they will serve to stimulate similar effort in many parts of the continent.

Gum Trees of the Australian Capital Territory retails at twelve shillings and is available from Angus & Robertson, F. W. Cheshire and Verity Hewitt (Canberra).

—J. H. Willis.

Field Naturalists Club Library

Library facilities are available to financial members of the F.N.C.V. and affiliated organizations. Loans are available for two months, renewable for a maximum of six months if not required by other members; however, current issues of periodicals are available for one month only. Through the Inter-library Loan Organization, the librarian can often obtain publications not available at the club's library. Loans will be forwarded, on request, to borrowers outside the Melbourne metropolitan area, who will then be responsible for their safe return to the library when the loan period has expired. The library is open at approximately 7.30 p.m. prior to general meetings and meetings of club study groups held at the National Herbarium, and members should be no later than 7.45 p.m. if they wish to borrow publications, or merely to browse. Members attending club meetings should enter details of items borrowed in the loan book, and should add signatures and date when an item is returned.

Club study groups, and members generally, are invited to suggest books, periodicals and other publications suitable for acquisition by the library.

Periodicals: Periodicals received regularly from Australia and overseas include:

Australian Journal of Botany; Australian Naturalist; Australian Plants, Australian Museum Magazine; Australian Museum Records; Darling Downs Naturalist; Emu; Fur, Feathers and Fins; Frankston Naturalist; Illawarra Natural History Society Circular; Journal of Agriculture; Linnean Society of New South Wales — *proceedings*; Maryborough Field Naturalists' Club Newsletter; North Queensland Naturalist; Royal Societies — Victoria, New South Wales, Tasmania, South Australia *papers, proceedings, transactions*, South Australian Naturalist; South Australian Ornithologist; Western Australian Naturalist.

Endeavour, *London*; Journal of the Quekett Microscopical Club, *London*; Garden Journal of the New York Botanical Gardens, *New York*; Kew Bulletin, *London*; Microscope, *London*; Plants and Gardens, *New York*; Pacific Science, *Honolulu*; Wild Life, *Nairobi*.

F.N.C.V. DIARY OF COMING EVENTS

ANNUAL MEETING

Monday, June 8, 1964—Annual Meeting at the National Herbarium, The Domain, South Yarra, commencing at 8 p.m. sharp.

1. Minutes of Meeting of June 10, 1963.
2. Annual Report.
3. Financial Report.
4. Election of Officers and Council.

The following have been nominated:

President: Mr. M. K. Houghton.

Vice-Presidents: Messrs. A. Fairhall and E. Byrne.

Secretary: Mrs. E. H. Coghill.

Treasurer: Mr. A. G. Hooke.

Assistant Treasurer: Miss M. Butchart

Editor: Mr. J. R. Hudsen.

Assistant Editor: Mr. R. H. J. McQueen.

Librarian: Mr. P. Kelly.

Assistant Librarian: Miss M. Lester.

Executive Secretary: Miss M. Allender.

Council: Messrs. E. R. Allan, R. Condon, B. F. Fuhrer, J. Ros Garnet, F. L. Jeffs, J. Quirk, T. Sault.

The Victorian Naturalist

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Plume Humea, *Humea elegans*

This photograph first appeared in the *Victorian Naturalist*, Vol. 55, [illegible] February 1939

Vol. 81, No. 3 July 9, 1964

F.N.C.V.

The Victorian Naturalist

Editor: J. R. HUDSON, B.Sc., M.R.C.V.S.

Assistant Editor: R. H. J. MCQUEEN, B.Sc., Dip.Ed.

CONTENTS

Front Cover:

The photograph of a female Tree Dragon, *Amphibolurus muricatus*, digging its nesting burrow was taken by David Fleay. It was first published in the *Victorian Naturalist*, Vol. 51, in February 1935.

Caves and Related Features of Mount Eccles

By C. D. Ollier

Mount Eccles is located 5 miles west of Macarthur, a township lying about half way between Hamilton and Port Fairy in the Western District of Victoria. Mount Eccles itself is a rounded scoria cone, but the cone is only the highest point of a complex of volcanic features. Adjacent to the scoria cone is the elongated crater occupied by Lake Surprise, with steep walls nearly 100 feet high, built of layer upon layer of lava. To the north is Bald Hill, a scoria cone of much greater age than the Mount Eccles volcanic features, and to the south there are many scoria and spatter cones all roughly in line with each other and with the long axis of Lake Surprise.

Mount Eccles was the centre for eruption of large quantities of basalt which have built up an extensive lava

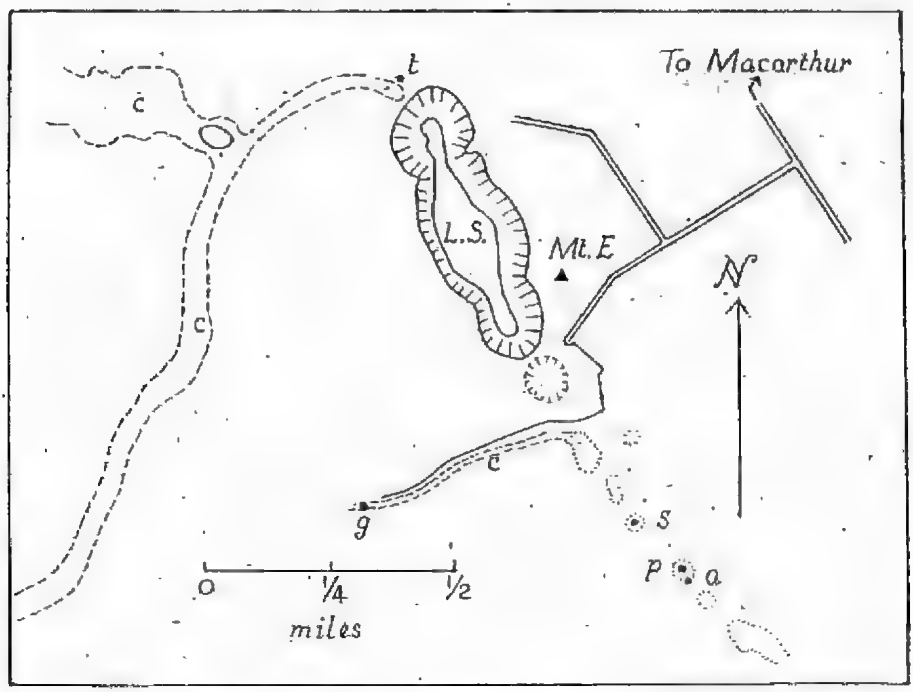


FIGURE 1—Location of caves at Mount Eccles. *t*, Tunnel Cave; *c*, canal; *L.S.*, Lake Surprise; *Mt. E.*, Mount Eccles summit; *g*, Gothic Cave; *s*, The Shaft; *p*, The Pit; *a*, The Alcove.

plain. From the vicinity of the hills several lava channels, locally called "canals", meander into the plains. These canals were the main conduits for lava at the time of eruption; lava flowed along them, occasionally spilling over the top of the banks and building a kind of levee bank of basalt and adding further layers to the surrounding plain. The main canal starts from the northern end of Lake Surprise and, after looping round it, bifurcates. Another canal goes from a small hill to the south of Mount Eccles and passes through Gothic Cave. These features are shown on Fig. 1. There are many unusual volcanic features in the Mount Eccles area which is remarkable also for having in one small area a variety of lava caves formed in several different ways.

FIGURE 2—Tunnel Cave, Mount Eccles.

FIGURE 3—Plan and two sections of Gothic Cave, Mount Eccles.

TUNNEL CAVE. (Fig. 2)

This cave is situated in the eastern side of the canal, just to the north of Lake Surprise. The entrance is an irregular hole about 5 feet across, descending into a flat-bottomed cave with arched roof. The roof is up to 15 feet high, and this is one of the most perfect tunnel-shaped lava caves in Victoria. The walls are almost intact, although a few fallen blocks litter the floor. Lava stalactites are abundant, and there are benches marking old lava levels at the bottom of some of the walls.

Tunnel Cave, Mount Eccles.

At the inner end of the tunnel the roof comes down to the floor in a curve, but there is an extension leading into an irregular small chamber up to 5 feet in height and 20 feet wide. This has many lava stalactites, and an irregular floor of blocky, broken lava.

Gothic Cave (Fig. 3)

Gothic Cave is situated on the southern canal, and is really a part of the canal with an unbroken roof. It is named from the shape of the cross section, which is rather like a gothic arch. The cave is best entered from the canal on the western side.

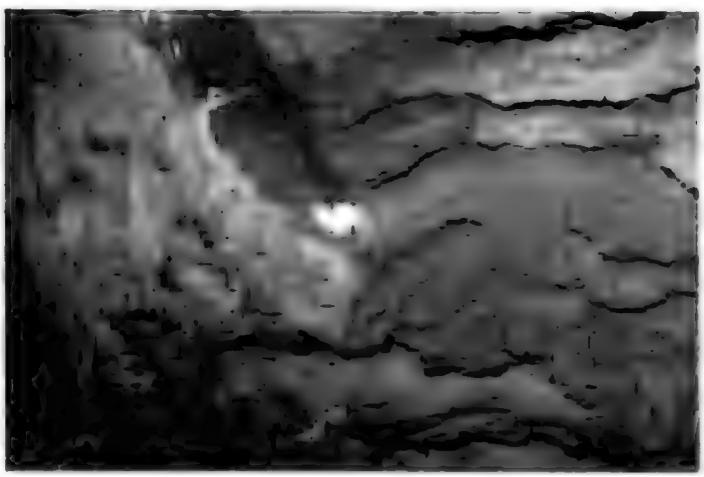
The covered part of the cave is only 100 feet long, and the roof at the highest point is about 25 feet above the floor. The roof is never more than a few feet thick and there is one small hole leading to the surface (next to the track) in addition to the main openings at each end.

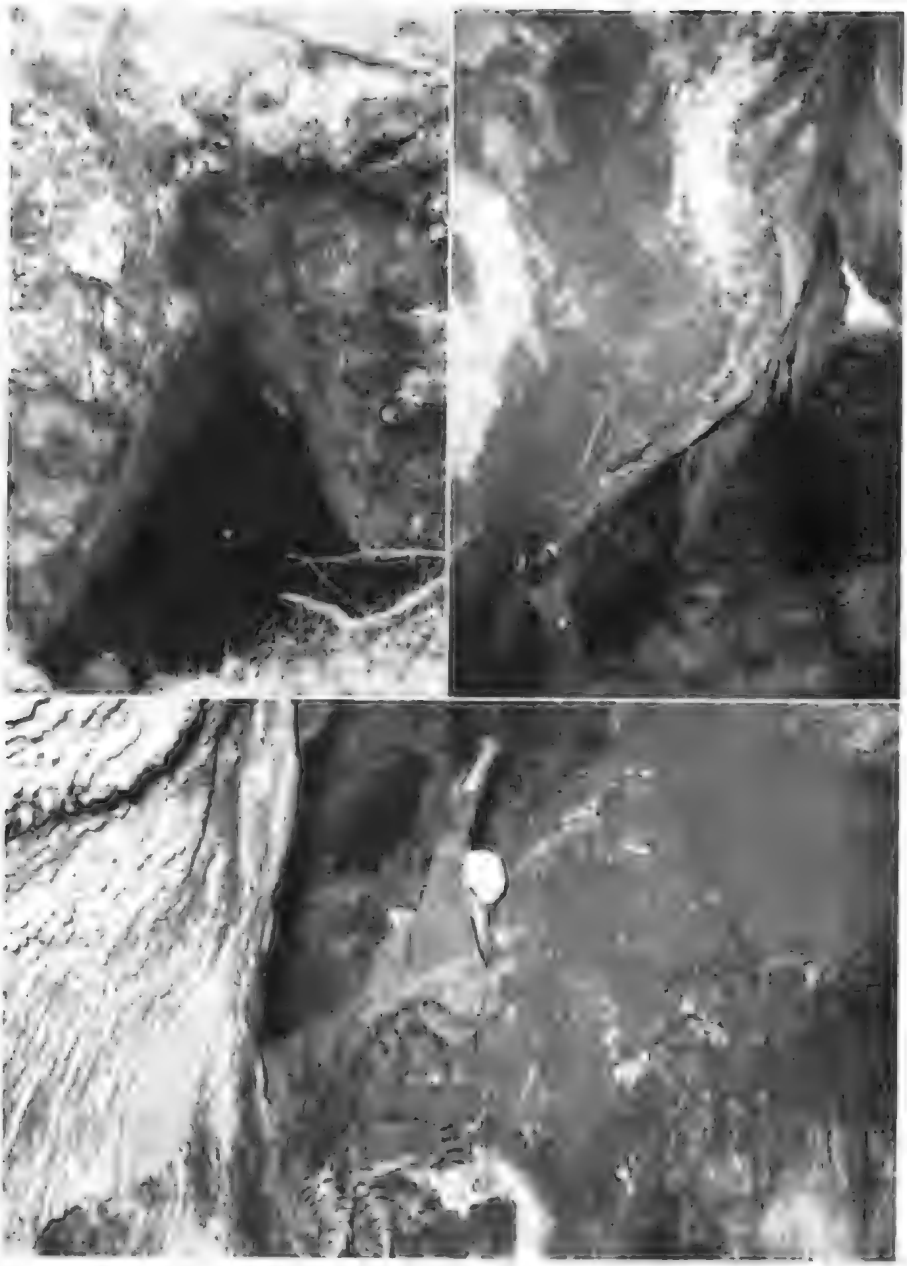
It has been already noted that lava tunnels occur in areas of layered lava (Ollier and Brown, 1964) and Gothic Cave is no exception, but it is remarkably different from the usual cave, because the layering is highly contorted.

Layered lava normally forms with the partings and vesicle bands in a nearly horizontal position and the contortions visible in Gothic Cave indicate intense deformation after the formation of the layers but before complete solidification.

It appears rather strange that the roof also is not deformed, but the ground surface above the cave is quite continuous with the surrounding lava plain. The shape of the cave is also highly unusual, and indicates deformation. It is probable that the cave was originally formed as a normal, tunnel-like cave, but was subjected to great stresses from moving lava before solidification had been achieved. The roof was already solid and withstood any deformation; the pressures were relieved by a squashing in of the sides of the tunnel, giving the present shape and the deformed layered lava.

The cave has a lining of comparatively smooth lava backed by vesicular lava, which covers the layered lava in places, especially on the southern wall. In one part of the cave, on the northern wall not far from the western entrance, a complex sequence of events is recorded with a lining covering





Above left—Gothic Cave, Mount Eccles. The entrance.

Above right—Gothic Cave, Mount Eccles. Contortions in layered lava.

Below—Descent into The Shaft.

layered lava that is in turn over another lining behind which is yet more layered lava.

There is a great deal of rock-fall in this cave, and the canal on both sides appears to be a collapsed lava tunnel. At the south-west end of the south-west opening there is an entrance leading to a very tiny cave or cupola.

The Shaft (Fig.4)

To the south of Mount Eccles is a small distinct spatter cone about 30 feet high that has an open vent known as "the Shaft". The orifice is lined with agglutinated driblets of spattered lava, and abundant lava stalactites. At its narrowest part the Shaft is only about 10 feet across, and below this it widens out again like a bell. Lava stalactites, dripstone and vegetation conceal much of the walls of the shaft but it seems that underneath the spatter cone there is a thick layer of fairly dense lava, where the shaft is narrowest, and below this the lava appears to be more frothy and vesicular. There are holes which are too small to enter in the lower parts of the walls and at the bottom there is a short descent under a "bridge" of frothy lava. The cave is floored by large boulders of frothy lava which, although loose and easily moved, do not appear to be fallen blocks but lumps of lava thrown only a little way, almost "gargled" in the throat of the volcano. The impression at the bottom of the shaft is one of very spongy lava.

The height from the top of the spatter cone to the base of the cave is just short of 100 feet. The cave has been descended several times by members of the Victoria Cave Exploration Society, who have measured the depth accurately, and there is no justification for exaggerated reports based on stories of throwing stones down the hole.

The Pit (Fig. 6)

South of the Shaft is another small hill with an open vent, known as the Pit. This has not been accurately surveyed but it appears to be about 30 feet deep, with a roughly rectangular opening and walls lined with lava stalactites. Vegetation covers the bottom, which appears to be littered wtih fallen blocks.

The Alcove (Fig. 6)

The hill that contains the Pit is breached on the southern flank by a hole, the Alcove, that leads to a small lava tunnel. The floor is obscured by fallen blocks except at the inner end where it is made of irregular corrugated lava. The roof descends in a series of curves, all covered with lava drips, and the cave appears to be a breached, complex swelling of a lava tunnel.

Geological Significance of the Caves and Shafts

The forms and features of the caves give valuable evidence for deciphering the geological history of Mount Eccles, which is a very complicated volcano, and also provide information on the mechanism of lava flow. A complete study of the volcano would involve more work on the crater of Lake Surprise, on the nature of the canals and on other volcanic features. This has not been done and so discussion will be restricted to a few outstanding topics relevant to the caves.

The Tunnel is one of the finest examples of a simple, tunnel-shaped cave, which is the normal or common type of lava cave. Lava caves have been recorded from many physiographic localities in Victoria, the flanks of volcanoes, lava plains, lava flows in valleys and lava discs. The tunnel now exemplifies a cave in a new setting, the flank of a canal.

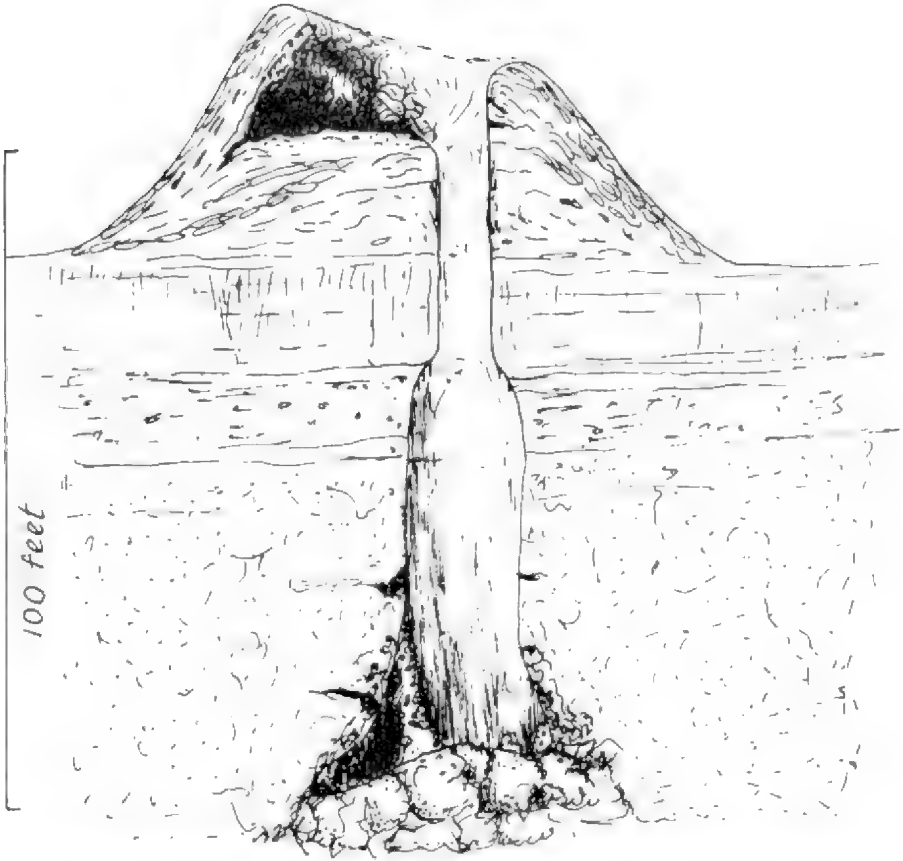


FIGURE 4—Surveyed profile of The Shaft, with semi-diagrammatic representation of the geology. Vertical exaggeration 2½X to give a more realistic subjective impression.

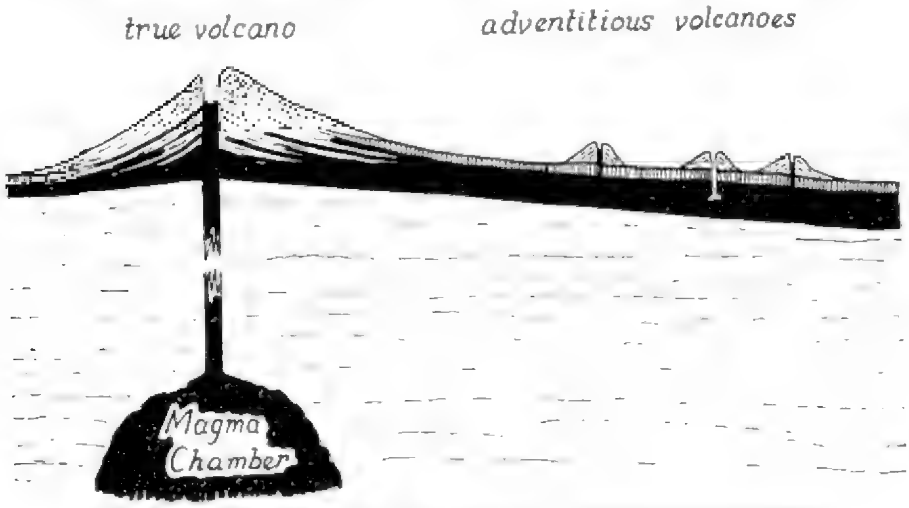


FIGURE 5—Diagram showing the distinction between a central type, true volcano, and adventitious cones.

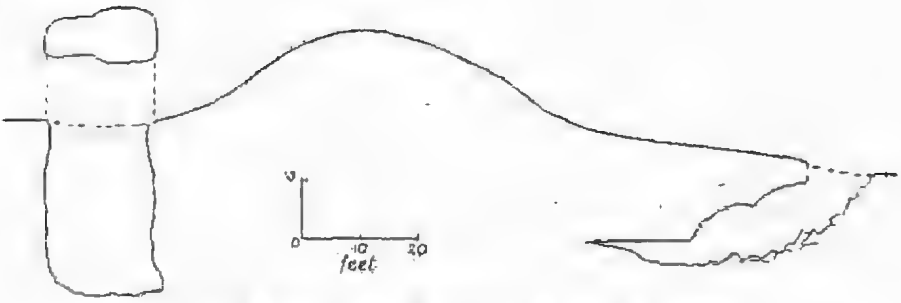


FIGURE 6—Sketch profiles of The Pit (left) and The Alcove

Gothic Cave is also related to a canal and is especially interesting as the first recorded, highly deformed cave in Victoria. Some slightly squashed asymmetrical caves have been found, such as the Turk at Byaduk (Ollier and Brown, 1964), but the layered lava is not displayed in them.

However, most interest in the Mount Eccles caves is centred on the shaft-like caves, for it is very rarely that one can enter the magma chamber of an extinct volcano.

It has already been mentioned that the hills to the south of Mount Eccles are in a line, and in addition to those with caves there are over a dozen small eruptions, many of which consist of agglutinated spatter around deep and distinct craters, very like the hill of the Shaft. Boutakoff (1963) believes that all these hills are erupted from a deep magma chamber and mark the surface trace of a fissure eruption. The Mount Eccles lineament, he believes, follows a major fracture in the earth's crust. This would suggest that each of the individual little cones has a neck going down to a common magma chamber deep below the crust.

However, the shape, size and composition of the cones, together with their arrangement in a line and even the possession of open vents, suggests that they may be adventitious cones, that is cones which come from a flow and not directly from a magma chamber. They do have a common "magma chamber" but this consists of the lava in the flow, and the roots of the volcanoes only tap the lava of the flow—they do not go down to the deep-seated magma chamber. The difference between true and adventitious cones is shown diagrammatically in Figure 5. Very similar adventitious spatter cones have been described from Hawaii by Wentworth and Macdonald (1953).

If the spatter cones may be adventitious then the nature of the lineament must be re-examined. Are the cones aligned along a flow, or along a deep-seated fissure eruption? The many spatter cones are undoubtedly aligned and the line goes also through Lake Surprise, which appears to be made up of three coalescing craters. Boutakoff (1963) claims Bald Hill is also in line, but the highest point is almost a mile off line. Mount Eccles itself is slightly off line, and the canals are not related to any lineaments.

If the spatter cones were the only evidence they would probably be regarded as adventitious cones on a flow from Mount Eccles, but since the craters of Lake Surprise are also in line the balance of evidence probably supports Boutakoff's hypothesis.

Nevertheless lineaments are extremely rare in the volcanics of Victoria (Ollier and Joyce, 1964), and whenever one is suspected it should be examined with great caution. Only further work can decide whether the cones are adventitious or the surface expression of a fissure eruption.

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PRELIMINARY NOTICE

Under the auspices of the Society for Growing Australian Plants and the F.N.C.V. the annual Wild Flower and Nature Show will again be held in the Lower Melbourne Town Hall on Monday, August 31, and on Tuesday and Wednesday, September 1 and 2.

It will be noted that these dates fall in the school holidays. Country clubs and individual members are invited to co-operate with exhibits and (or) suggestions.

So that items may be incorporated in the show, information regarding same should be sent to the

Director of the Show
Mr. D. E. McInnes
129 Waverley Road, Malvern
(Phone 211 2427)

as soon as possible.

A detailed notice will appear in the August issue of the *Naturalist*

F.N.C.V.

Excursion to Mt. William, April 19, 1964

The object of this excursion to the vicinity of Mt. William, north-east of Lancefield, was to examine the site and workings of an aboriginal quarry, an area used by them as a source of stone for their axes and other implements. A large party wandered over the two or three acres marked by piles of chippings and flakes. There are rewards for the searchers in half finished or broken pieces, for the honest aborigine did not try to batter anything but the perfect article.

The rock is a hard diabase belonging to the Cambrian belt which stretches northward for some miles from here. Its toughness defies the geologist's hammer, and compels admiration for the tenacity and patience of these stone-age men. To the anthropologist the area is of special interest, for this is one of the few or only example of family or tribal trading in Victoria. These axes, recognized by their type, are picked up all over Victoria, having been bartered by the natives for other goods.

On the way back to Lancefield a brief investigation of a graptolite bed on the side of a new road deviation revealed some interesting examples of these early fossils. A visit was also made to the Springfield Falls off the Kilmore-Lancefield road, but the creek was not running though the immediate gorge was quite picturesque.

The quarries may be reached off the Pyalong-Lancefield road by a by-road ending at a gate branching off to the right just beyond the mountain to be clearly seen on the right. Visitors should not fail to ask permission to cross the paddocks on foot and examine the quarries from the house near the gate. The owner is Mr. A. O. Powell, Pyalong Road, Lancefield (Phone Lancefield 61D). To the left is a paddock full of interesting granite tors and slabs. A recently published map of the Lancefield area has been issued by the Department of Mines. It is handy for reference.

—R. G. Hemmy

Alan Moorehead's Cooper's Creek—
Congratulations and Commentary

By J. B. CLELAND

This account of the Burke and Wills Expedition and description of the Inland is excellent. It particularly appeals to me as one who, forty years ago when it was almost a major undertaking to do so, passed through Innamincka on the Cooper on his way to enquire into arsenic poisoning at Cordillo. Alan Moorehead followed the course of the ill-fated explorers and the fascination of this region, with its gibber plains and rises, its red sandhills, its inland watercourses sometimes silently flowing nearly bank-high through a waterless country, has captured him. It is not all a Dead Heart.

The comments here made when critical are such as any reasonable author, not surrounded by a battery of specialists, may expect. Quotations are used as texts.

Flea-bitten Dogs

"As for the naked aborigines, . . . except for a few flea-bitten dogs (they) possessed no domestic animals of any kind!" (p 2)

I know of no evidence that the dingo (the dog referred to) harboured, before European occupation, an indigenous flea apart perhaps from stick-fast fleas accidentally acquired from a marsupial host. If it did possess in its own right a mobile flea, this would be of the greatest interest. Our natives have been separated from other races of mankind for perhaps 20,000 years. The dingo undoubtedly came with them. If the flea was a Dog Flea *(Ctenocephalus canis)*, did it differ at all, after perhaps 10,000 generations, from the European Dog Flea? The Aborigines had changed during that period to a distinctive type over a lesser number of generations. Professor Harvey Johnston considered that the Head Lice *(Pediculus capitis)* in the hair of natives in Central Australia were darker in colour but otherwise indistinguishable from our Head Lice.

Bag-moth Caterpillars and the Fearsome Sleeping Lizard

On the Darling, bag-moth caterpillars were met with (p 51). "If one touched these nests a painful irritation was set up and it lasted for days. There was also a little black scaly lizard with a stumpy tail that looked equally harmless and was equally poisonous. Its face had the mild expression of a kitten, and it lay still and motionless in the dust, but a bite from its great triangular bird-like mouth left a suppurating sore." What a reputation for the Sleeping Lizard, *Trachysaurus rugosus*, now I am sorry to say *Tiliqua rugosa*! Dampier was equally condemnatory. Here is his account of the land animals he saw at Sharks' Bay. (*A Voyage to New Holland* Reprint, The Argonaut Press, 1839, p 85.) These were "only a Sort of Raccoons . . . And a Sort of Guano's,

of the same Shape and Size with other Guano's describ'd . . . but differing from them in three remarkable Particulars : For these had a larger and uglier Head, and had no Tail : And at the Rump, instead of the Tail there, they had the Stump of a Tail, which appear'd like another Head; but not really such, being without Mouth or Eyes : Yet this Creature seem'd by this Means to have a Head at each End; and, which may be reckoned a fourth Difference, the Legs also seem'd all 4 of them to be Fore-legs, being all alike in Shape and Length, and seeming by the Joints and Bending to be made as if they were to go indifferently either Head or Tail foremost. They were Speckled black and yellow like Toads, and had Scales or Knobs on their Backs like those of Crocodiles, plated on to their Skin, or Stuck into it, as part of the Skin. They are very Slow in Motion; and when a Man comes nigh them they will stand still and hiss, not endeavouring to get away. Their Livers are also spotted black and yellow. And the Body when opened has a very unsavory Smell. I did never see such ugly Creatures any where but here. The Guano's I have observ'd to be very Good Meat : And I have often eaten of them with Pleasure; but tho' I have eaten of Snakes, Crocodiles and Allegators, and many Creatures that look frightfully enough, and there are but few I should have been afraid to eat of, if prest by Hunger, yet I think my Stomach would scarce have serv'd to venture upon these N Holland Guano's, both the Looks and the Smell of them being so offensive."

But one of my daughters put a little nightie on one and in cold weather it lay contentedly and placidly in a doll's cot between miniature sheets and blankets. Its gaping mouth when alarmed looks ferocious but all it can do is give a firm pinch which may draw blood when it closes on a finger.

The Introduced *Rumex roseus*

Burke's party left Menindie on October 19th 1860. "But now the spring had begun and wild flowers had started to cover the red earth. : wild hops of a brilliant magenta colour." This is an anachronism as the plant can only be the introduced *Rumex roseus*. When I went to Cordillo in 1924, this plant was known to be spreading in a pass through the hills north of Beltana. It had been there for several years. Now it is widespread and often abundant in the Far North so as to colour hillsides and plains. Being a handsome plant in flower, its spread is partly due to station people taking seeds home with them when a fresh focus of natural dispersion is established. In this way, doubtless, it reached Ernabella.

Nardoo *(Marsilea)*

The sentence "from the seed of a plant they called Nardoo they made a rough kind of flour" in its context (p 19) suggests that Sturt used this word. In Morris's *Austral-English* the first reference given is for 1861 in a quotation from "The diary of H. J. Wills" but this did not appear in print till 1876. The next reference is dated 1862, from Andrew Jackson's "Burke and the Australian Exploring Expedition of 1860" (p 186) where flour was called by the natives "white-fellow nardoo."

Pitcherry (Pituri) *(Duboisia hopwoodii)*

The branchlets and leaves of the *Duboisia* are not roasted but dried (p 118). Moorehead quotes King,

I presume from his diary (unpublished) but it does not read quite like a diary entry. In any case, it is a good account. "After chewing it for a few minutes I felt quite happy and perfectly indifferent about my position, in fact much the same effect as might be produced by two pretty stiff nobblers of brandy. After chewing it the natives do not throw it away but place it behind the ear, much in the same style as a sailor places his quid in his hat, until it has lost all its goodness. Offering this pitcherry pill to a stranger is the greatest expression of amity which, however, we did not at first understand and felt rather disgusted than otherwise when they used to press upon our acceptance their nasty, dirty-looking balls of chewed grass, as it appeared to be. Young tribesmen were not allowed to use it."

This reference does not appear in the paper by Professor T. Harvey Johnston and myself entitled "The History of the Aboriginal Narcotic, Pituri" (*Oceania* Vol IV Part 3, March 1934).

Do any Animals besides Man shed Tears? Do our Natives do so?

The tears of "cruel craftie crocodiles" are said to be a physiological and not an emotional response. An article entitled "Crocodile Tears" by P. H. Golding-Wood (*Brit. Med. J.*, 8/6/63, p 1518) describes profuse lachrymation occurring only when food is taken. Charles Darwin in "Expression of the Emotions in Man and Animals" says "with the doubtful exception of the elephant, man is the only animal capable of weeping in sorrow."

Moorehead quotes from Sturt, apparently on the Cooper, "a strange scene—a group of seven men crying bitterly" (p 20). Were they merely wailing or actually shedding tears? In any case this would be "ceremonial crying." King took the natives to see where Burke lay dead. "On seeing his remains the whole party wept bitterly, and covered them with bushes." (p 148)—crying for sorrow.

Sturt (*Narrative of an Expedition into Central Australia*, I, p 162) wrote "The natives appeared really glad to see us again, for I believe they had given us up for lost. My old friend shed tears when he embraced us." Again (I, p 148) "The old boocolo took leave of Mr Browne and myself, according I suppose to the custom of his people, by placing his hands on our shoulders, and bending his head so as to touch our breasts; in doing which he shed tears." Still further (II, p 9) "The poor fellow cried, and the tears rolled down his cheeks, when he first met Mr Browne." Our natives thus certainly weep for joy, and perhaps ceremoniously.

Sturt's description of this scene (Vol II, p 69) is as follows: "We heard a most melancholy howling over an earthen bank directly opposite to us, and saw seven black heads slowly advancing towards us. . . . The group consisted of a very old blind man, led by a younger one, and five women. They all wept most bitterly, and the women uttered low melancholy sounds, but we made them sit down and managed to allay their fears . . . These poor creatures must have observed our coming, and being helpless, had I suppose thought it better to come forward . . . We gave the old man a great coat."

Moorehead's paraphrase is: "Here in this wilderness they interrupted a strange scene: a group of seven men crying bitterly. Nothing could make

them explain the occasion of their grief, they cried and cried and would not stop, and in the end Sturt was obliged to go on his way, having left them a present of his greatcoat."

Parakeelya

"On the orange-coloured sandhills the pink mesembrianthemum was in flower" (p 136). Evidently parakeelya (*Calandrinia balonensis* or *C remota*). Red sand collected at Cordillo in 1924 was in colour near Vinaceous Rufous and Ferruginous, Plate XIV in Ridgway's Color Standards and Color Nomenclature.

The First News of Burke and Wills Return

This, as Moorehead points out, came through Adelaide. Dr Wills, father of the explorer, had come over to Adelaide. It must have been on September 25, 1861, that he received from Major Warburton, Commissioner of Police, news from the police-trooper at Wirrulpe near Mt Searle dated September 12, stating that a native, Sambo, had reported a party of white men in difficulties (p 134). The letter was read in the House of Assembly by the Commissioner of Crown Lands and published in "The Register" of September 26. My father, then a boy of 14, was with his uncle, Alec Glen, whose station was near where Leigh Creek is now. He wrote to his father in Adelaide from Blanchewater on September 6, giving the same news brought in by Sambo. This letter, written six days before that of Trooper Howe, was published in the same issue of "The Register."

The Desert Sound

The Desert Sound has been heard by various explorers, a noise like that of a great gun being fired. It probably still is heard as frequently as in the days of exploration but escapes notice, being attributed to human agency. Wills and King heard it on The Cooper on May 24, 1861. Moorehead quotes from Wills' diary (p 121) as follows: "Whilst picking the seed (nardoo), about 11 a.m, both of us heard distinctly the noise of an explosion, as if of a gun, at some considerable distance. We supposed it to be a shot fired by Mr Burke, but on returning to camp, found that he had not fired or heard the noise. The sky was practically overcast with high cum. str. clouds, and a light breeze blew from the east, but nothing to indicate a thunderstorm in any direction."

I have myself heard the Desert Sound on August 9, 1907, at 8.30 in the evening near the Strelley River between Port Hedland and Marble Bar in Western Australia. It sounded like a great gun being fired.

I recorded my experience, and gathered information on other and similar instances in a paper "On the Occurrence of Explosive or Booming Noises (Barisal Guns) in Central Australia" (*J. Proc. Roy. Soc. N.S.W.* XLV 1911, p 187). Sturt heard it on February 27, 1829 at 3 p.m. near Bourke on the Darling and twice in September about 9 a.m., on succeeding days between his Stony Desert and Eyre's creek. The Sound was heard on the Elder Expedition and Dr Farnsworth heard it 100 miles from Ngullagine in Western Australia. It has been suggested that it is due to the splitting of great rock masses by changes in temperature ("rock tumble down") or that it comes "out of the earth" (subterranean sources).

Carrier Pigeons

Howitt brought four carrier pigeons

from Melbourne. Their tails were so abraded, that wild pigeons were shot and with waxed thread their tail feathers spliced on to the stumps (p 151). When liberated they were at once attacked by kites (falcons presumably). Are tail feathers necessary for flight? On the Adelaide University Anthropogical Expedition to Mount Liebig in Central Australia in 1932, an Adelaide newspaper supplied carrier pigeons to its representative, but falcons watching from the mountain heights above us, swooped down on them with terrific speed.

Accidental Slips

"The Mulgas skimming by in green flocks" (p 84) evidently refers to budgerygahs.

"The spring was now well advanced" (p 93), April, Autumn, probably written in the northern hemisphere.

"Sturt's wild pea (which proved to be quite harmless to the camels)" p. 58. Sturt's Pea is *Clianthus*. The Darling Pea (*Swainsona*) is the poisonous one. I do not think camels would eat the prostrate *Clianthus*.

"We proceeded in a car to the residence of Dr Wilkie." p 155). "Good God!" I said, "jump into the car" (p 155). Surely these should be "cab", Hansom cab. One could *jump* into a Hansom cab—I have often done so in Sydney, but in Adelaide they were considered "fast". One would *get* into a growler (four-wheel cab) or buggy.

"Sturt, Mitchell, Kennedy and Gregory had all been on Cooper's Creek", (p 37). Mitchell and Kennedy had been on the upper tributaries of the Cooper but I would not consider they had been on the Cooper proper.

January 18, 1861 "Still on the ranges, the camels sweating profusely from fear" (Burke's Diary) (p 74). Do camels sweat? Would they do so from fear?

Cicadas Singing all Night

Near Eyre's Creek beyond Birdsville in January "Cicadas shrilled loudly in the branches all night long." (p 76). This is interesting and should be confirmed. The entomologists at the South Australian Museum have heard cicadas in the gloaming.

Centaurs.

Did Sturt say (p 19) that the tribes on their way up from Menindie were "very primitive, on seeing a horseman for the first time they had thought that man and beast were one creature like the mythical centaur, and they had run off in astonishment when the man had dismounted."?

Though the natives of America may have been astonished at such disjunction, our aborigines seem to have expressed very little surprise at, or even interest in, what must have been exceedingly novel to them at their first contact with Europeans. Thus Dampier in 1688 off our North-West coast met with a "drove of these men swimming from one island to another". His people "took up four of them and brought them aboard. To these we gave boiled rice and with it turtle and manatee boiled. They did greedily devour what we gave them, but took no notice of the ship or anything in it; and when they were set on land again, they ran away as fast as they could."

Hawdon (*The Journal of a Journey from New South Wales to Adelaide performed in 1838 by Mr Joseph Hawdon, printed in 1952*) on February 21 (p 34) wrote:— "It was quite evident that the natives looked upon the oxen as rational beings, as they

. . . saluted them with their usual friendly exclamation "Bo, bo, Marwood," (and) waving green boughs at them in token of peace." On March 2 "one of them asked me in perfect seriousness whether the heifers, pointing to the cattle, were our wives." Hawdon, of course, would be on horseback.

Sturt's Small Acid Berry

May I take this opportunity of referring to the "small acid berry", eaten by the natives, which helped to relieve the symptoms of scurvy from which Captain Sturt was suffering on the return journey when about 116 miles north-west of the Darling. Mr Browne, "went into the hills and gathered me a large tureen full" (Vol. II, p 108). I had been puzzled for some years as to the plant from which these came. *Leptomeria* (Santalaceae) has I believe been suggested but this is far beyond its range. The fruit of Ruby Saltbush (*Enchylaena tomentosa*) is insipid, not acid. Solanums are very bitter but would occur there. A visit in 1962 with Dr Eric Sims and Mr Geoffrey Lithgow to Mootwingee, 70 miles N.E. of Broken Hill, solved the problem. The Native Currant *Plectronia latifolia* grows in the Ranges and there can be little doubt but that the berries came from this Rubiaceous tree.

Field Notes from Ringwood Field Naturalists Club

During the last month several groups of members made the journey to a small sanctuary near Yarram where *Pterostylis fischii is* found. The first group found but four specimens, but nearly a week later the second party found about a dozen heads of this rare and beautiful greenhood. It is to be hoped that this species will continue to flourish. Just outside the sanctuary were many tall plants of *Acianthus exsertus*, the Gnat Orchid.

It must have been a very good year for the late autumn and early winter orchids because the Superb Greenhood (*Pterostylis grandiflora*), the small Autumn Greenhood (*Pterostylis reflexa*) and the Trim Greenhood (*Pterostylis concinna*) were all found and photographed.

Of the other orchids discovered three were of particular interest. These were all helmet orchids. Near Waratah Bay the Fringed Helmet Orchid, *Corybas fimbriatus* was found. Quite close to it were *Corybas unguiculatus*, the Small Helmet Orchid, and also the rare and localized Spurred Helmet Orchid, *Corybas aconitiflorus*. Some very good photographs were shown to members of these three orchids.

At Wilson's Promontory, the Black Cockatoo and Rainbow Lorrikeets were particularly common amongst the banksias. Coast banksia (*B. integrifolia*) was of particular attraction to the lorrikeets, and it seemed a pity that some gnarled old specimens, in full blossom, had to be bulldozed out of existence. In all, four of Victoria's banksias were seen at Wilson's Promontory this trip.

Adding beauty to the scene at Sealer's Cove were large masses of Red Correa (*Correa reflexa*). How different these bushes appear to the dainty bushes of *Correa reflexa* found in the Black Range, Telangatuk East.

Near Telangatuk East, at Halmoral, on a moonlight but very cold night during May, a Tuan (*Phascogale tapoatafa*) was seen on a Red Gum (*Eucalyptus camaldulensis*); a Brush-tail Possum was also seen, and the Stone Curlews were making their eerie sound just to add to the thrill of such an excursion.

An unidentified bandicoot was seen in the heathlands to the north-west of Portland. In the same area a Blue Boronia bush was found on the side of a bush track. It was in full bloom. While in Portland area the petrified forest near here was brought to attention when a small piece of petrified tree was discovered.

Bat Mandible from Mt. Widderin Cave, Skipton, Victoria

By K. G. Simpson and G. T. Smith

Mt. Widderin Cave is situated on the northern flank of Mt. Widderin, a former effusive lava cone, on the sheep station "Widderin", owned by Mr. C. Notman. It is four miles south of Skipton, and twenty-five miles south-west of Ballarat, Victoria. The cave is a Pleistocene-Recent (Newer Basalt) lava tunnel, consisting of three chambers, the entrance being situated in a depression that presumably is a collapsed fourth chamber. (See description by Ollier, 1963.)

During an inspection of the lava tunnel in May 1961, the authors collected a sample of bat guano from the south side of the mound of guano in the centre of the main (first) chamber. After drying, and during subsequent sorting, we found the right mandible of a bat.

The specimen is mineralized and stained dark brown. The three incisors and canine are absent. The second and third premolars are broken off level with the dorsal surface of the dentary. The first premolar is complete, as are the three molars.

The mandible is similar in all respects to recent specimens of mandibles from *Miniopteris schreibersi* (Kuhl), the Bent-Winged Bat, and is considered to be of this species. The mandible is from an adult individual, as judged on the basis of measurements, and the degree of wear to the molars. The amount of wear is considered to be equivalent to stage 2 of the list by Miller and Allen (1928), i.e., wear obvious, but not obscuring the structural characters of the molars. The mandible has been lodged in the National Museum of Victoria (Reg. No. P22760).

Accounts of the early history of the cave at Mt. Widderin are somewhat confused. Ulrich (1875) quotes Selwyn (1866), saying

> "Thousands of bats inhabit these caves, hanging in clusters from the roof, like a swarm of bees, and on the floor are large conical mounds of a rich brown earthy matter.
>
> "The deposit consists entirely of the excrements of these animals."

A postscript to the article is appended:

> "The deposit has since been used by the farmers of the neighbourhood to great advantage as a valuable manure."

Fletcher (1895) states:

> "Bats are credited with being the producers of this (guano) deposit, with what truth I cannot say, as the 'oldest inhabitant' has never seen a bat in the cave.
>
> "... although we turned over some six or seven tons of stuff, no bones or fossilized forms were met."

It is not known whereabouts in the cave Fletcher turned over the guano, nor from where the local farmers removed it. The late Mr. S. R. Mitchell reported seeing

> "great heaps of guano from this cave offered for sale in a warehouse in South Melbourne about the turn of the century." (E. D. Gill, pers. comm.)

Mitchell himself obtained guano for the National Museum collections about 1930, and other collections are known to have been made at various times since. We do not know, therefore, if the mandible was in its correct stratigraphic horizon within the cave. No bats have been recorded in Mt. Widderin cave at any time since the colony described by Selwyn. Only three normally cave-dwelling Microchiroptera are recorded from Victoria. Of these, *Myotis adversus* Horsfield is comparatively rare in both Victoria and South Australia, and *Rhinolophus megaphyllus* (Gray) appears to be restricted in its present range to east Victoria. Congregations in existing colonies of the above two species are not numerically great.

Miniopteris schreibersi, on the other hand, is by far the most numerous cave-dwelling bat throughout southern Queensland, New South Wales, Victoria and eastern South Australia at the present time. The species occurs in groups numbering several thousand or more individuals quite commonly. All extensive guano deposits (and many small ones) in caves so far discovered throughout the region described above, have been formed by these bats. The reason for the permanent desertion of the cave by bats at some time between 1866 and 1895 has not been determined. Possibly a change in the cave climate or human interference was to blame.

From knowledge of the present day distribution and habits of the *M. schreibersi* population, together with the identification of the mandible, the extent of the guano deposit, and from Selwyn's description of the large bat colony in residence about 1866, the authors have little hesitation in attributing the large guano deposit of Mt. Widderin cave directly to *Miniopteris schreibersi*.

In age, the specimen necessarily postdates the formation of the cave and its most recent limit is 1866. In the absence of other data, and due to its uncertain stratigraphic position within the cave, the mandible is considered to be a Recent subfossil.

Acknowledgements

We wish to express our gratitude to Mr. P. D. Dwyer, Department of Zoology, University of New England, N.S.W., for loan of comparative material, and to Mr. E. D. Gill (Curator of Fossils) and Dr. Beaseley (Curator of Minerals) at the National Museum of Victoria, for information.

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Subscriptions Now Due

Membership fees and subscriptions to the *Naturalist* for 1964-65 were due for renewal by May 1. If you will not be paying your fees at one of the forthcoming general meetings, please remit them by post. Receipts will not be sent for payments by cheque unless requested.

This procedure will save office-bearers time, and expense, in sending out reminder notices.

Bush Brushes

The fox's brush was the traditional trophy of the chase. The Field Naturalist usually returns from an excursion into the bush with a different sort of "tale". If you have one worth mounting and preserving send it to the Assistant Editor, "Victorian Naturalist", 102 Murray Road, East Preston, N.18, Victoria.

The Babbler Problem

Two further notes on Babblers have come to hand. The first is from Mr. N. F. Learmonth, of Portland.

I have a simular bird problem to that of Mr. A. H. Chisholm, and it too concerns Babblers. In 1911, when I returned to Victoria after several years in Queensland, it was quite usual to see Gray-crowned Babblers in open forest lands near the Lake Condah Mission Station in S.W. Victoria. Their big bulky nests were a feature of the landscape.

They suddenly disappeared and in my rounds of stock-riding I missed their chatter and scrub-jumping. The Bridgewater Lakes country was another area favoured by these birds, but here also they faded out about 1914.

In 1940 I made mention of these facts to Mr. Les Chandler, and we made a search round the Mission country without success. During the trip we met an aboriginal youth and asked him about the birds. Oh, yes, he knew all about them; they were "somewhere round here" I promised him ten shillings if he found them. I still have the money!

Now here comes the sequel. About sunset on 3rd March, 1963, my nephew Jim and his wife, both keen nature lovers, were driving along a back road near the old Mission Station and saw hopping along the roadside in low scrub, dead timber and bracken a flock of Babblers. The birds were within three miles of where I had last seen them in 1912. They must have been visitors as such a prominent species could hardly have been overlooked in the locality during 51 years. I have made several visits to the locality since that March evening but no sign of a Babbler.

In school-boy days Babblers were a feature of the Queenscliff Road and You-Yangs country. What do residents know about them today?

Mrs. E. G. Bedggood, of Ballarat, reports on the reduction in numbers of White-browed Babblers from Mt. Beckworth, near Clunes.

During the past six years that we have been observing birds at Mt. Beckworth, we also have remarked on the sharp decline of the Whitebrowed Babblers there, and wondered what might be the cause. In 1958 there was quite a large population there, but during the last nesting season only three records of nesting were made in the whole area, and a total day count would not exceed thirty birds.

Nesting and population of other species seem to be adequately maintained. However, 1963 saw a marked increase in breeding of Pointed Quail, Rufous Songlarks, Speckled Warblers, Diamond Sparrows, and White-browed Wood-swallows. Budgerigars, Black-eared and Brush Cuckoos were also observed.

Total bird count for the area as compiled by Mr. J. Wheeler, Geelong, is 114 species.

Mutton-bird Mortalities

These observations and questions have been received from Mr. Ellis Tucker, of Brit Brit, via Coleraine.

On a trip to Cape Bridgewater on January 12, in an area on a tussocky cliff-face about half a mile south of the Blowholes, we were surprised to find many dead Mutton-Birds (Short-tailed Shearwaters) freshly dead and seemingly in perfect condition. We counted well over one hundred birds in about two hundred yards, ranging from approximately fifty to two hundred feet above the sea.

We covered the area thoroughly, but could find no sign of nesting burrows. The birds had apparently been killed by flying into the hillside. I understand that

this occurs also at Cape Grant, Portland, each year. Can anyone give any explanation of the apparent mass suicide?

One banded bird was found and the band was sent to the C.S.I.R.O., Canberra. We were informed that the bird had been banded as an adult at Griffiths Island, Port Fairy, by Miss G. Bowker on January 10, 1963.

It was interesting to note that, in the wind-swept sand of old aboriginal middens on the cliff-top, there were many burnt and broken bones which I believe were from mutton-birds. Did the aborigines know of this yearly visitation and profit by it?

Lyrebird Local Dialects

This observation comes to us from Mr. K. C. Halafoff, who has carried out an extensive study of Lyrebird songs and the variations which occur in the songs of these birds from different localities.

Recording Lyrebird songs in the areas recently set aside as Scenic Reserves by the Forests Commission, namely Cement Creek and Mount Victoria, I noticed a definite difference in the "stanza" melody in those two areas. Playing back the recorded tapes confirmed the impression obtained on the spot.

Like many other birds, the Lyrebirds have their local dialects, but in this case, the fringes of these areas were only one and a half miles apart, and there was no natural obstacle between them to prevent intermigration. How it came about that such close neighbours speak two different languages is a puzzle which may remain unsolved.

Probably the first Lyrebird families to settle in each of these areas came from regions where the dialects differed, and they did not need to venture outside their new territories. New generations in each of these forests were raised and taught to sing by the parents. So the traditional melody has been preserved in its original form in each tribe, although both populations have increased in the areas occupied until nearly to the point of touching.

Elbow Orchids

The following notes about one of our most inconspicuous orchid species have been sent by Miss Jean Galbraith, of Tyers.

The remark by J. H. Willis, in *A Handbook to the Plants of Victoria*, that the Elbow Orchid, *Spiculaea huntiana*, is "... in some seasons locally abundant, but usually overlooked" in Victoria was emphasized by its abundance in Gippsland last season.

Mr. and Mrs. J. Peterson, of the Latrobe Valley F.N. Club, who noted this thread-like species in abundance above Walhalla, later showed me patches of it above Moondarra Reservoir, near Yallourn North, and again in a proposed wildflower sanctuary along the Walhalla Road.

In every case, I should have missed the little plants, inconspicuous against the dry leaves of the forest floor, had they not been pointed out to me. Mr. Peterson also found two patches during a club excursion to Bennison Plains.

The flowering season is fairly long. A specimen was sent to me from the Tambo Valley early in November last, and there were newly-opened flowers on the Bennison Plains on January 25. In the latter case, the altitude would delay flowering, but those near Yallourn were still flowering on January 20.

Western District Birds

The following bird-notes have been sent in by Mr. H. R. Hobson from Roseberry in the Victorian Mallee.

During the Labour Day long weekend last March, I traversed part of the Western District in search of items of natural history interest to help break the monotony of farm life.

Shortly after leaving Roseberry, a Black-shouldered Kite was seen. This species was again encountered near Port Fairy and then in the Colac district, an indication that these birds are widespread in the western part of the State.

In the area between Hall's Gap and Dunkeld, both Yellow-tailed Black Cockatoos and Gang Gangs were noted. From Dunkeld to Port Fairy, large flocks of Long-billed Corellas were seen feeding on the roadside.

On the beach at Port Fairy, a few Sharp-tailed Sandpipers and many Little Stints were observed. Hooded Dotterels, Black-fronted and Red-capped Dotterels, several Pied and Sooty Oystercatchers, and a beach-washed Gannet were all seen along the eastern section of the beach.

Early on the Sunday morning, a Brown

Bittern was flushed from reeds into the open at a drainage swamp near Airey's Inlet. The Bittern was immediately chased by three Eastern Swamp-hens. It left without retaliating and came down in reeds along a nearby river. Little Grebes and two Dusky Moorhens were also noted in the swamp and along the beach three beach-washed Fairy Penguins were found.

As a fitting climax to an interesting week-end, two Brolgas were seen in a paddock quite close to the road just north of Derrinallum.

NOTICE

Nullarbor Plain Safari

(December 27, 1964—January 12, 1965)

Mr. Bill Kennewell plans to conduct a safari tour to the Nullarbor to explore several of the caves. The tour will leave from Melbourne and travel via Adelaide, Port Augusta, Ceduna to Nullarbor homestead and the Ivy caves, on to Koonalda cave, thence to Abrocurrie and Weebubbie caves. Camping gear and eating utensils are required, but meals are supplied. Fare is £49 and bookings, accompanied by £10 deposit, should be made with Mrs. R. A. Sinclair, 22 Haldane Street, Beaumaris, Vic., who will also supply full details of the tour.

Light is Important

By W. C. Woollard

How many persons, as they place a 10× eyepiece in the microscope tube after using a 5× eyepiece, ever give thought to the Inverse Square Law of Illumination, even if they have heard of it in Basic Physics during school days?

The law may be explained in simple terms by considering a source of light that illuminates an area of one square foot at one foot distance. If projected to a distance of two feet, the same light covers an area twice as long and twice as wide. Thus, as the amount of light is the same, the intensity is spread over four square feet instead of one square foot. So, when you double the magnification of an object, you increase the area seen by four times, and if the intensity of the lighting remains the same, the illumination is one-quarter the previous intensity.

This is why an object, when looked at with a higher power, very often appears much duller than with the lower magnification.

This is not noticed so much when using bright field lighting, because there is usually more light than is needed for the lower powers and the condenser on the substage can be opened up to give more than enough light, but it is another story with top lighting. If the lighting is just sufficient to give adequate illumination with the lower magnification, any attempt to raise the magnification with either objective or eyepiece will result in an image poorer in appearance in comparison with the lower power image.

The remedy is to increase the amount of light and this may be carried out in any one of three ways.

The first is to increase the intensity of the light source, using higher voltage if one has a low voltage lamp, or using two lamps instead of one.

The second method is to move the lamp nearer to the object, remembering the law: reduce the distance to half and you increase the intensity four times.

The third way is to use a lens to focus light on to the object. But the smaller our light source is focused, the greater the intensity.

The Field Naturalists Club now has designs for two accessories for use with the F.N.C.V. Microscope. One

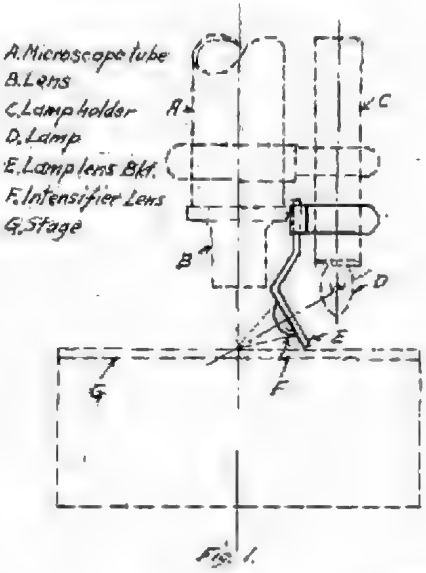

Fig. 1.

is a small attachment, as shown in the line drawing Fig. 1, for intensifying the light when viewing objects with top lighting using a 10× objective lens. This attachment has a small bulls-eye lens which increases the light considerably and allows a clear view of objects at the increased magnification. A limited number of these attachments are available from the Club at 10/- each. As the device attaches by a spring clip to the light-tube, no alteration to the standard set-up is required.

The second item, shown in Fig. 2, is a small stand to support the standard Lamp Tube and Intensifying Lens shown in Fig. 1, thus giving greater flexibility in arranging top lighting of objects to be viewed on the stage of the F.N.C.V. Microscope. The stand consists of a vertical pillar, ¼ in. diameter and 3½ ins. high, fixed to a solid base, 2 ins. square by ¼ in. thick, with a sliding clip made from two ¼ in. tool clips joined back to back by a small ⅛ in. metal-thread screw and nut. This sliding clip serves as a universal joint for carrying the standard lamp with or without the intensifier. Should you be unable to make this stand yourself, a limited number will be available from the Club for 17/6. When the stand is set up with lamp intensifier a very bright spot of light is obtained for illuminating microscopical specimens.

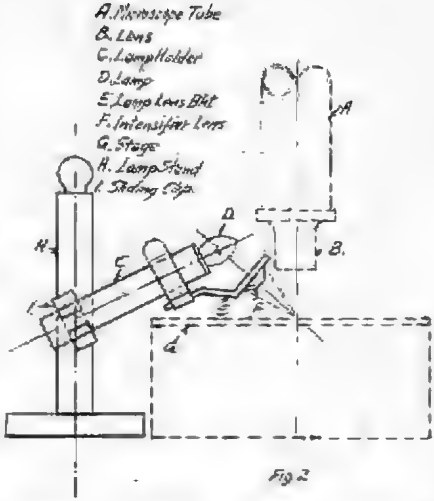

Fig 2

Both the Intensifier and Lamp Stand are available by contacting Mr. W. C. Woollard, 24 Smythe Avenue, Mont Albert.

F.N.C.V. Publications Available for Purchase

FERNS OF VICTORIA AND TASMANIA, by N. A. Wakefield. The 116 species known and described and illustrated by line drawings, and there are 30 photographs. Price 7/6.

VICTORIAN TOADSTOOLS AND MUSHROOMS, by J. H. Willis. This describes 120 toadstool species and many other fungi. There are four coloured plates and 31 other illustrations. New edition. Price 9/-.

THE VICTORIAN NATURALIST. Except for about half the numbers of the first nine volumes (1884 to 1893), almost all back numbers of the journal are obtainable from the club. Assorted lots are available, dealing with particular subjects (mammals, birds, orchids, geology and anthropology).

PAMPHLETS. Lyrebirds of Sherbrooke and **Sherbrooke Diary**, both by K. C. Halafoff (1/- each). **The Land Flora of Victoria** (from 1962 *Victorian Year Book*) (2/-). **The Yellow-tufted Honeyeater**, by N. A. Wakefield (2/-).

Address orders and inquiries to Sales Officer, F.N.C.V., National Herbarium, South Yarra, S.E.1, Victoria. Payments should include postage.

Field Naturalists Club of Victoria

Annual Meeting, June 8, 1964

About one hundred members were present, with Mr. M. K. Houghton in the chair.

Mr. E. H. Coghill presented the Secretary's report for the year, as printed in the June *Naturalist*, but directed that the first part of the section on "Accommodation" be deleted, as the main hall of the Herbarium would still be available.

The financial statement as printed in the *Naturalist* was presented by Mr. A. G. Hooke. He stressed the contribution, largely due to Mr. Wakefield's efforts, made by supporting members. Subscriptions increased by £88, while sales of the *Naturalist* and back numbers were down £61.

The continued support of the Ingram Trust in improving the quality of the *Naturalist* was acknowledged, and a much appreciated legacy of £2,600 from the estate of Miss Marion Wright of Western Australia was reported.

The following officers were elected:

President—Mr. M. K. Houghton.
Vice-Presidents—Messrs. A. Fairhall and E. Byrne.
Treasurer—Mr. A. G. Hooke.
Assistant Treasurer—Miss M. Butchart.
Editor—Mr. J. R. Hudson.
Assistant Editor—Mr. R. H. J. McQueen.
Librarian—Mr. P. Kelly.
Assistant Librarian—Miss M. Lester.
Excursion Secretary—Miss M. Allender.
Council—Messrs. E. R. Allen, R. Condon, J. Ros Garnet, F. L. Jeffs, T. Sault.

Mr. W. P. J. Evans consented to act as Honorary Auditor for the coming year.

Mr. E. Hanks moved a vote of thanks to the retiring Council.

The Secretary announced that the 1963 Natural History Medallion had been awarded to Mrs. Thistle Stead (Harris), who had accepted an invitation to attend the November General Meeting to receive the award.

A volunteer was requested to go to seven bookstalls each month to pick up the previous month's unsold copies of the *Naturalist* and deliver the new ones.

The President's address stressed the need for Nature Conservation, and expressed apprehension concerning the future of Australian flora and fauna. In many districts of Victoria increased planting of exotic pines was sweeping the natural plants aside. A special area of concern was Fishermen's Bend and the mouth of the river, a good area for shore birds and waders, Musk Duck, Pelicans and Crested Grebes, with Stilts and Avocets at Appleton Dock. Two years ago young Stilts were reared near the Princess of Tasmania Terminal and Pelicans could be seen drilling in unison. Dykes have been formed criss-crossing this country and soon the birds will have to go elsewhere.

Basic factors must be considered for conservation. Increasing pressure on the community's leaders will make for difficulty in preserving such areas. It was a matter of concern to members that, growing up in a large city, there were numbers of young people who would never know the beauties or characteristics of Australian components of the countryside. Their senses were tuned only to loud sounds, quick movement and bright colours so that they were not able to appreciate the quietly changing aspects of the countryside. The bush was as alien as to the early settlers. It should concern us that many young people would never know the real pleasure, that we had, in birds' calls and Manna Gums by mountain streams. After eighty years of existence this Club could only show one Junior Club in a city of nearly two millions. The Hawthorn Junior Club could be a blueprint for many more similar clubs throughout Melbourne.

Miss J. Woollard said that parents often asked where their children could go. Mr. D. McInnes said it needed only two or three enthusiasts in an area to start a new group. Mr. J. Baines suggested that circulars about the Club Microscope sent to schools might start a new group. Miss M. Allender advised selecting some localities widely apart and making a start in such centres.

Mr. E. Francis pointed out that children showed interest in rocks, and Mrs. Salau supported this view, saying that parents at the Nature Shows often en-

quired where they could learn about them. Mr. A. Fairhall said that Teachers' Colleges had good teachers, instancing Mr. Hyett and the Nature Club at Burwood. Mr. E. Byrne spoke of the lack of time in the Nature Study course at the Colleges. Miss J. Woollard said that while young children were interested, especially in birds, matriculation work interfered with the interest. She said that Somers Camp with Mr. A. Reid's work and paper was a bright spot in the outlook.

Mr. J. Quirk warned of a threat to exterminate seals off southern Victoria in the interests of the fishing industry. He moved a resolution that the F.N.C.V. noted with alarm the threat to seals and requested the government to take steps not to harm them. This was supported by Mr. J. Ros Garnet. Mr. Stawell warned that the aim was extermination and not just the destruction of a few seals. Mr. Garnet advised influencing members of parliament to help to shape events. Mr. J. Baines deplored the nibbling at parks by removing trees from the Fitzroy Gardens, and said that Council should register a protest.

Exhibits included: rocks from Heathcote and Beechworth (Mr. E. Francis); *Drosera binata* from Mt. Clyde (Mrs. Sutherland); a curious lichen from Brisbane Ranges (Mr. J. R. Garnet); double *Eriostemon verrucosus* (Mrs. E. Bennett); wood sections from Forest Products (Mr. D. McInnes and Mr. W. Woolland), longicorn beetles, genus *Hesthesis*, with very short elytra, long hindwings and banded abdomen resembling flower wasps, collected in the Brisbane Ranges on flowers of the Grass Tree (Mr. P. Kelly); a long stick-insect and a birds-nest fungus. Miss J. Woollard exhibited hand coloured photographs of Australian wild flowers by the late Mr. Fred Bishop.

Fourteen new members whose names appear in the June *Naturalist* were elected.

Mr. H. Stewart brought to notice the current excellent number of *Victoria's Resources Magazine*—a wild flower issue.

Microscopical Group—February 19, 1964

Mr. LeMaistre was in the chair at this meeting, which was attended by twenty-six members and visitors.

Mr. D. McInnes announced that a section of the club journal would in the future be set aside for articles on microscopy, entitled "The Naturalist and the Microscope".

Kits comprising small quantities of all of the materials necessary for rock-section grinding were on sale, also a part of the microscopical equipment of the late Dr. Bob Wishart was offered for sale to members of the group. Mr. Woollard informed the members that he would be able to supply condensing lenses for the "Club" microscope.

The rest of the evening was devoted to a display of stained botanical sections made by Mr. Cliff. Nance, which were projected on to a screen through Mr. E. Snell's microprojector. Mr. Nance identified all of the different plant tissues of these most beautifully stained sections, the colours of which have to be seen to be believed.

Showing under microscopes were some specimens of fuschia, desmids and of the elusive water bears.

Microscopical Group—March 20, 1964

This meeting was attended by twenty-seven members and visitors, and Mr. E. LeMaistre was in the chair.

Mr. D. McInnes suggested that the group's section in the club journal should cover two aspects of microscopy: description of technique and of things to be seen.

The guest speaker for the evening, Mr. T. Colcheedas, who is a laboratory technician for Tromak, commenced his most illuminating talk by showing the group an 8 mm. movie colour film taken with time lapse photography. This film showed most dramatically the growth of the penicillin fungus in a petri dish. He then went on to outline the history of antibiotics from Fleming's discovery of penicillin in 1929. Unfortunately he only used it for diagnostic purposes and it was Florey who ten years later used extracts of this important fungus for the treatment of disease.

The speaker then went on to describe in detail the way in which the mould was cultured and the penicillin extracted.

Mr. Colcheedas showed the group petri dishes with growing bacteria and demonstrated the antibiotic action of penicillin evidenced by blank spaces surrounding areas where penicillin was present.

Under the 12 microscopes in use were shown penicillin mould growths and stained bacteria.

Microscopical Group—April 15, 1964

Nineteen members and visitors attended this meeting, which was chaired by Mr. E. LeMaistre.

A large number of blocks and sides cut out of perspex were available for those who wished to make "Micro Jars" (see article by H. A. Dade). Mr. P. Genery spoke about the necessity of boiling the glycerine and water mixture for removal of dissolved air before filling "Micro Jars".

Mr. Williams from the firm of Electromes Industries Ltd. kindly brought along two of Bausch and Lomb's new microscopes for the group's examination. Model E.S.M. 10 and 100 were ideal for the youngster, although the 100X magnification was too high. Model S.T.Z. was equipped with a "Zoom" eyepice and took the magnification from 25X to 100X most dramatically. The focussing stage had both advantages and disadvantages, but most members expressed disappointment at the lack of a substage condenser.

Samples of diatomaceous earth from Happy Valley were available to members who wanted them. Mr. H. Barratt outlined to those present his method of cleaning and separating diatoms for slide making. He said that the specimen contained fossil types of freshwater diatoms.

Microscopical Group—May 20, 1964

Thirty-five members and visitors attended this meeting, which was held at the Forest Products Division of the C.S.I.R.O. at South Melbourne.

Members assembled in the lecture hall, where first the role of the light microscope in identifying wood by the structure of its vessels and tracheids was explained. Then in a most lucid manner the theory and technique of electron microscopy was explained.

Those present were then taken into the laboratories and in small groups allowed to enter the electron microscope room and view a specimen of wood-tissue through the department's Siemens electron microscope under a magnification of 20,000X. They were then taken to witness the "ultra microtome" in operation. From there members went to examin the magnificent Zeiss microscope with its built-in camera and several different forms of illumination. Although fixed to a steel shock-proof desk, this instrument was nevertheless so sensitive that it could not be used during the peak traffic period because of vibration.

Finally members were conducted to a laboratory where technicians were cutting, staining and making slides of wood sections; those who wanted them could take home sample slides.

The evening was rounded off by a supper supplied by the department, during which our chairman, Mr. LeMaistre, thanked all those who had made the evening possible and the members of the group so welcome.

Botany Group—May 14, 1964

Members' night brought forward an array of interesting and varied topics, all unusual. Mr. B. Fuhrer's first subject was slime moulds, and slides of close-ups of these were shown. He then passed on to *Pisfanoua weindorferi* and gave some detail of its distribution, as well as showing slides of its habitat. Mr. Rex Filson had prepared lichens under the microscope and graphic detail of the fruiting body of the lichen. Mr. K. Kleinecke's subject was the Hartz Mountains of Germany, and a wealth of detail was given of its animals and minerals and, in particular, its forests and conservation laws.

Reports covered the Kallista excursion given by Miss A. Hooke, and arrangements to date regarding publication of *Wildflowers of Victoria* were given by Mr. J. Baines. The next excursion was decided for 31st May to Blackwood Ranges, meeting at 9.30 a.m., Batman Avenue.

The next meeting, 11th June, will include the election of officers for the ensuing twelve months.

Geology Group—June 3, 1964

Twenty-three members were present, with Mr. L. Angior in the chair. Mr. R. Davidson reported briefly on a visit to Horsham, where he gave a lecture on "Fossils" to the local Field Naturalists Club. Including visitors, about 100 persons attended. Mr. N. Wigmore stated that he had interviewed Mr. East, of the State Rivers and Water Supply Commission, seeking his co-operation in preserving glacial pavements likely to be damaged by waters of the Eppalock Weir. Mr. East was prepared to help, and asked for detailed particulars, which Mr. Wigmore is to supply in writing. Mr. F. Robbins, of Bendigo, is photographing the pavements by stereophotography, so that a permanent record may be available. Steps are also to be taken to plot correctly the location of the pavements on the survey map. Further plans were outlined for the Group's exhibit at the next Nature Show. Arrangements were made for an excursion to Bulla and the Organ Pipes at Sydenham on Sunday, 7th June.

The subject for the evening was "Geology of the Mesozoic" by Mr. R. Davidson. The speaker opened the subject by making brief reference to the naming of the different eras and periods and the great changes of life which had taken place at the end of each. This could be qualified as outside of Europe no great break occurred between the Palaeozoic and the Mesozoic. The Triassic was first planned in England and Germany, the Jurassic after the Jura Mountains of Europe and the Cretaceous from the chalk deposits of England the the Continent. For most of the Mesozoic period the types of plants were horse-tails, conifers and cycads. The dominate forms of animal life were amphibians, saurians and ammonoids. Desert or dry conditions appeared to be the climatic environment for a considerable time, resulting in the Triassic of huge deposits of salt, combined with magnesium and phosphates. There was a proliferation of the reptilian forms of life, including pterodactyls in the air. During the Jurassic a warm climate extended almost all over the globe, combined with swamps and shallow lakes. A luxuriant vegetation laid the foundations of the coal measures found in the formations of this period. Reptilian life reached its apex with forms ranging from huge to small in the air, on land, and in the sea. The Cretaceous was marked by extensive marine conditions and flooding of the land. Reptiles were still dominant, but became practically extinct by the end of the period. In the Upper Cretaceous modern flowering plants began to appear, thus considerably brightening the landscape. Marsupials and mammals were gradually becoming prominent.

In Australia, although much the same sequence of physical conditions applied, the forms of life appeared to be somewhat more sparse and different. Only traces of dinosaurs have, as yet, been found in Australia. Extensive Triassic swamps around the present site of Sydney laid down some 2,000 feet of sandstone. The Triassic is only poorly represented in Victoria at Bacchus Marsh, where it appears to be conformable with the Permian. The Jurassic is found in the Otways, at Lorne, and Geelong and contains the coal measures at Wonthaggi. The Cretaceous is not represented in Victoria, but an extensive invasion by the sea from north to south could have almost divided the continent. Many sandstones of the famous artesian basin were also formed at this time. The speaker emphasized the point that owing to the sparsity of the Mesozoic in Victoria, it was almost impossible to study it thoroughly. An interesting discussion closed the lecture.

Exhibits: A comprehensive collection of fossils to illustrate his lecture (Mr. Davidson); sections of Limburgite from quarry at Pretty Sally Hill, under both high and low power, showing olivine changed to iddingsite and augite.

Field Naturalists Club of Victoria

Librarian's Annual Report, 1963-1964*

During the year there have been substantial additions to stock in all sections of the Library. The installation of a modern, efficient loans system has facilitated handling the great increase in the number of loans to metropolitan, country and interstate members and to members of affiliated organizations.

The following members staffed the Library during this period: Librarian, Miss M. E. Argo; Assistant Librarian, Mr. P. G. Kelly; Botany Group Librarian, Mr. J. A. Baines; Fauna Survey Group Librarian, Mr. D. Woodruff; Geology Group Librarian, Mrs. M. Salau; Marine Biology and Entomology Group Librarian, Mr. P. G. Kelly; Microscopical Group Librarian, Mr. P. Genery. It is hoped that these members will be able to continue their assistance to the Library during the coming year.

A recently completed stock take disclosed several hundred books missing, including some recent acquisitions, also a large number of periodicals. In an endeavour to recover the maximum number of these publications, an appeal has been made to members to return overdue loans. Lists have also been dis-

* This and the two following reports were received too late for inclusion in the June issue of the *Naturalist*.—Editor.

played at meetings and are being published in the *Naturalist*.

Plans are now being finalized to completely re-accession the stock of books and bound volumes of periodicals. Unbound volumes of periodicals will be bound as parts to complete our sets as they come to hand. Lists of parts and volumes required are being dispatched to exchange organizations, universities, and scientific societies.

It is regretted that it has been necessary to cover over the main book-shelves and cordon off the remainder of the Library; this is a precautionary measure in view of the large number of missing publications.

Members will be sorry to hear that as from 1963 the Moomba Nature Show has been discontinued. Our Library had organized the Publications Stand at the Show, with the satisfactory financial result to the Club of about £200 profit from sales of publications over the whole period (1958 to 1963).

The Library looks forward to a very successful year during 1964/65, and thanks members for their much appreciated co-operation during the past year.

Groups

Microscopical

The Microscopical Group has just completed a most interesting and active year.

Possibly the most important, single event of the year was the birth of the F.N.C.V. Microscope, the product partly of the Group but mainly through the work and organization of Messrs. McInnes and Woollard. Sales of the microscope started well, following the display at the Nature Show, and have continued to the present day.

The year was marred by the tragic loss of Dr. Bob Wishart, folowing a long illness, and the resignation of Mr. Jack Evans, also through illness. Both of these members have left an indelible impression on microscopy in Australia, and both have bequeathed to the Club a considerable amount of equipment, slides, chemicals, and literature which, of course, has been very acceptable. On the credit side was the gain of a number of new members, mostly beginners, but also the discovery that we have in Victoria a most outstanding microscopist and mycologist of world-standing in the person of Mr. H. A. Dade of Benalla.

Lectures were given by three outside speakers on the ultimate structure of the living cell as elucidated by the electron microscope, on the laboratory technique of yeast extraction and on penicillin production. Five members of the group gave talks full of interest on diatom and opaque slide making, on desmids, botanical section-cutting and staining. Two "Members Nights" were held, and two nights were devoted to the projection through a member's micro-projector of botanical and rock sections. The latter was of particular interest as polarised light was used and showed great possibilities. In addition a film night attracted some forty visitors and members.

Attendances at all of the above events were consistently good. Because of the influx of members new to microscopy the greatest interest was in talks devoted to practical microscopy.

Fauna Survey

This year the Fauna Group has experienced a continuation of the kind co-operation of the Fisheries and Wildlife Department and monthly meetings are held under the auspices of this department.

Active field work involving the collection and examination of mammal bone remains has taken place. Much work has been done in the western parts of the State this year, and a great deal of assistance and co-operation has been received from interested members of several country clubs. Some of the results of these investigations have been already published in the *Naturalist* and other papers are being prepared.

Throughout the year spotlighting excursions have been made by small parties of group members, and the result of these have been most rewarding.

Several new faces have appeared at the group meetings, and membership continues to grow satisfactorily.

Some of the expenses incurred by the Fauna Survey Group in field work and the purchase of equipment have again been met by a generous grant from the M. A. Ingram Trust.

F.N.C.V. Library—Missing Books

Section: Vertebrate Zoology (excluding fishes) — Study Group Librarian: Mr D. Woodruff

Book No.	Author and title
D2/12	Fitzsimmons: Snakes.
D2/20	Kinghorn: Snakes of Australia (copy 1).
D2/23	Waite: Reptiles and amphibians of South Australia.
C1/2 and C1/3	Gould: Birds of Australia, vols, 1 and 2.
C1/5	Hall: Key to the birds of Australia (rev. ed.).
C2/5	Gosse: Birds of Jamaica.
C2/12	Littlejohn and Lawrence: Birds of our bush.
C2/13	Belcher: Birds of the district of Geelong.
C3/1	Coward: Migration of birds.
C3/4	Atkinson: British birds eggs.
	Harrap: Wild animals of Australia.
	Brazenor: Mammals of Victoria.

This is merely a selection of books missing from the section. Members holding any books or periodicals from the library are urged to return them as soon as possible, both out of consideration for fellow-members, and to avoid the necessity of further action taken for recovery or replacement. Any information as to the whereabouts of missing books or periodicals would be welcomed by the club librarian or, by the appropriate Group librarian.

The Victorian Naturalist

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Earlston aborig. grinding rock.

The Wild Flower and Nature Show, 1964

On Monday, August 31, and on Tuesday and Wednesday, September 1 and 2, the Lower Melbourne Town Hall will be the site for the annual Wild Flower and Nature Show, staged by the members of the Society for Growing Australian Plants and by the F.N.C.V. The wild flowers, from all Australian States, are garden grown. There will be a comprehensive display from the Maranoa Gardens, Balwyn.

The main display by the F.N.C.V. will be a realistic beach scene, featuring typical birds and flora of the foreshore, and fauna of the tidal zone. The *birds* in this scene are a special feature, and are the subject dealt with in the printed leaflets, which emphasize the need for their protection and preservation.

The Botany Group will stage an exhibit depicting Australian conifers. For purposes of comparison reference will be made to some exotic species.

The exhibit prepared by the Geology Group will explain and demonstrate the more important elements which constitute our earth.

The Hawthorn Junior Branch of the F.N.C.V. will demonstrate methods used in making rock slides for viewing under the F.N.C.V. microscope. As a special feature, a number of these will be used for showing live specimens of marine and pond life, insects, and various other slides. Mrs. Freame will exhibit her extensive collection of preserved marine specimens.

The Entomology and Marine Biology Group will have a display of live marine life, shells, and a novel entomological exhibit. The ever popular live spiders, snakes, and lizards will again be on view.

The State Film Centre has made available an excellent selection of Nature Films, which will be shown free at frequent intervals.

Members are asked to make this function known as widely as possible, and to assist with the setting up, and especially with the supervising of the show.

At the August General Meeting of the Club, forms will be distributed on which members will be asked to indicate at what times they will be available to help. A great deal of assistance is needed, and those free to offer this would find it both interesting and rewarding.

It will be noted that, this year, the Show will be held in the school holidays.

LETTER TO THE EDITOR

Sir,

In the article "Bird Life at the M.M.B.W. Farm, *Vict. Nat.* 1, 81, May 1964, it is stated that nesting boxes have been erected in the lagoons by bird watchers, who also band the young ducks. In case this should cause confusion, it should be understood that banding ducks in Victoria can only be carried out by the Fisheries and Wildlife Department. Birds other than ducks may of course be banded by licenced amateurs under permits from this Department and the C.S.I.R.O.

Officers of this Department were also responsible for erecting the nesting boxes at the farm.

Yours faithfully,
A. DUNBAVIN BUTCHER
Director of Fisheries and Wildlife

29 June, 1964

Vol. 81, No. 4 August 6, 1964

The Victorian Naturalist

Editor: J. R. Hudson, B.Sc., M.R.C.V.S.

Assistant Editor: R. H. J. McQueen, B.Sc., Dip.Ed.

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Front Cover:

This is one of David Fleay's photographs of a Numbat (*Myrmecobius fasciatus*) eating termites. It appeared originally in the May 1942 number of the *Vict. Nat.* (59: 4).

Native Pines

By Steve Marshall

Pines belong to the flower and seed-bearing division of the plant kingdom known as *Spermatophyta*. This division has the further subdivisions, *Gymnospermae* and *Angiospermae*, which latter is sometimes called the subdivision of *true* flowering plants. Gymnosperms are the naked-seeded plants, and are distinguished from Angiosperms by having flowers consisting of stamens and ovules without an ovary, without a style, and without floral design—that is, simple and essential flowers only. Since pines have these characteristics they are gymnosperms or members of *Gymnospermae*.

Gymnosperms are further divided into a number of orders, only one of which concerns us here, *Coniferales*, or conifers. This order is made up of seven families, three of which, *Cephalotaxaceae*, *Taxaceae*, and *Pinaceae*, do not occur naturally in Australia and four of which, *Cupressaceae*, *Araucariaceae*, *Podocarpaceae*, and *Taxodiaceae*, do. It would be wise to point out at this juncture, that other systems of classification exist, due to the adoption of different criteria and varying emphasis on characteristics by individual botanists. This is very confusing to the seeker of information but, it should be realized, has little practical effect on the recognition of species, there being generally a greater degree of accord at this level.

The family *Cupressaceae* is represented in Australia by the genera *Callitris*, *Diselma* and *Actinostrobus*. They all have very small scale-like leaves closely borne along the branchlets, and carry many seeds to the cone, the cones being valved and globular in shape.

Callitris columellaris—White Cypress Pine is often known as Murray Pine, occurring as it does in the Murray Valley as well as in drier areas of five mainland states, including rain-shadow areas in East Gippsland and to the north and west of Melbourne. Owing to the economic development of land it is now much more restricted in distribution than it used to be.

As in other members of the genus, *C. columellaris* has six valves to the fruiting cone, three long and three short. In this species, however, the cones are never warted and only finely wrinkled, and about ½" in diameter. The leaves are whorled, averaging seventeen to the inch along branchlets, and their outer surface is rounded. Sometimes juvenile leaves are present, erect and prickly, and this characteristic also occurs in other species of the genus. This species is tree-like in form, occasionally reaching sixty feet.

Callitris preissii—Slender Cypress Pine ranges through the Wimmera and Mallee in Victoria, and occurs in three other mainland states, not extending as far as Queensland in the north. This species could be confused with *C. columellaris*, as it is similar in form, in leaf-shape and arrangement. However, cones usually bear large scattered warts, and the tree forms an alliance with a shenak, *Casuarina cristata*, on sand-ridges. Moreover, the cones are larger, the scales thicker, and the cones are borne on the tree long after maturity.

Callitris verrucosa—Scrub Cypress Pine ranges from the Victorian Mallee to all mainland states, and is similar in leaf detail to *C. columellaris* and

FIGURE 1—*Callitris columellaris*.

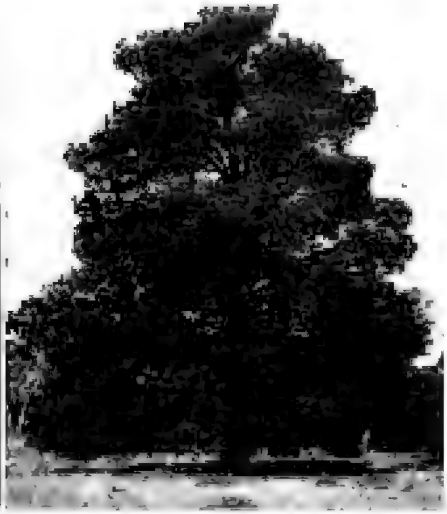

FIGURE 2—*Callitris preissii*.

FIGURE 3—*Callitris verrucosa*.

FIGURE 4—*Callitris rhomboidea*

C. preissii, but the cones are densely warted and the habit never exceeds a stunted tree. It is usually shrubby, spreading and branching, growing amid definite mallee types of vegetation.

Callitris rhomboidea—Oyster Bay Pine is chiefly near-coastal in distribution, occurring in all states except Western Australia. In Victoria it grows as far inland as the Little and Big Deserts, the Grampians and Mt. Arapiles. Whorls of leaves are more spaced than in the above species, about ten per inch, and the outer surface of the leaf is keeled. Cone-scales are

broadest towards the tip, and the cones are wrinkled, each scale bearing a very prominent backward-bent wedge-shaped structure in its upper part. In form this pine is either a pyramidal shrub or a small tree.

Callitris endlicheri—Black Cypress Pine is distributed from south-east Queensland through the tablelands of New South Wales to the Upper Snowy and the north-east of Victoria. Leaves are spaced and keeled as in *C. rhomboidea*, but in the cones the scales are narrowed upwards, and each has a small prominence towards its tip. The cones are generally smallish and more oval than in most species, and the tree is small to medium in size, often about thirty feet in height.

Callitris macleayana—Port Macquarie Pine grows in the north-coastal region of New South Wales to Queensland. It is unusual in the genus by reason of its occurrence in subtropical rain-forest and its distinctive cones; unlike those of other species the scales are of equal length, forming six flattened sides tapering to a pointed apex. The tree can be very tall, up to 150 feet, but is usually smaller.

Callitris muelleri—Illawarra Pine is very restricted in distribution, being confined to the Sydney-Wollongong district. The leaves are rather longer than in most species, and the cones have a flattened top, due to the three larger scales being oblong and blunt, whilst the intermediate smaller ones are pointed and long-triangular. The tree is stiff and erect in form and occasionally up to fifty feet tall.

Callitris oblonga grows only in Tasmania, and is there known as Native Cypress. The leaves are similar to those of *C. rhomboidea* which also grows in the State, but the cones are rather longer than round, the tips of the scales being narrowed and blunt with a small prominence. It ranges from about 6 feet to 10 feet in height, and is symmetrical in form.

Callitris drummondii—Drummond's Cypress Pine has a largely coastal distribution in South and Western Australia, and is a shrub or small tree. The cones are small, rounded and smooth, occasional forms having a spur on the scale, but this is never prominent.

Callitris morrisonii—Morrison's Cypress Pine inhabits rocky places in the south-west of Western Australia, and is similar in form and in fruiting cone to *C. drummondii*. However, there is a greater relative difference in size between the smaller and the larger scales, and the leaves are more grey-blue in colour.

Callitris roei—Roe's Cypress Pine grows in Western Australia, but is rare. Twelve to fifteen feet high, its cones are quite distinctive, the scales meeting at the top of the cone along three lines which radiate from the centre at angles of 120 degrees. Each scale also has a distinct prominence on its surface.

Diselma archeri grows only in Tasmania, and is there distributed from the central plateau to the west and south-west in wet places more or less at 4,000 feet elevation. Shrubby and about six feet high, it is occasionally rather larger. It has very small leaves close to the stem, close together and keeled on the outer surface. The cones are borne on the ends of branchlets, and are usually less than ½" diameter.

Actinostrobus pyramidalis—Swan River Cypress Pine is near-coastal in distribution in the south-west of Western Australia. The leaves are small, scale-like and close to the stems, but it makes a dense-foliaged, upright bush about ten feet in height. The

FIGURE 5—Cones of *C. preissii.*

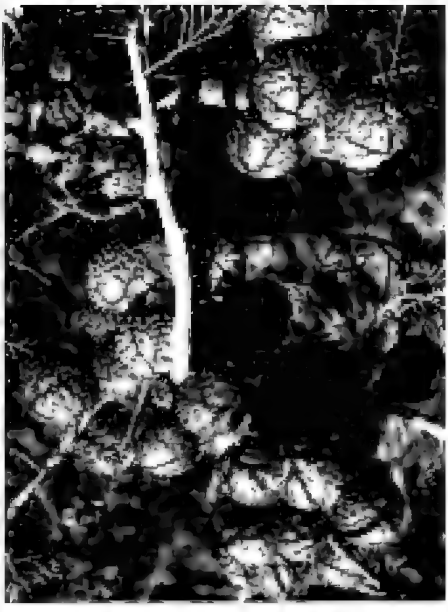

FIGURE 6—Cones of *C. verrucosa.*

FIGURE 7—Cones of *C. rhomboidea.*

FIGURE 8—Cones of *Actinostrobus pyramidalis.*

cones are distinguished from those of *Callitris* species by having scales of equal length which in turn are surrounded by outer scales and bracts which are shorter. In this species, the cones are rounded, about $\frac{1}{2}''$ diameter.

Actinostrobus psammophila—Sandplain Cypress occurs in Western Australia, also. It has more greyish foliage than *A. pyramidalis* and the cones are more conical than rounded.

Actinostrobus acuminatus is a prostrate shrub from Western Australia, having smaller leaves than *A. pyramidalis*, and the cones taper to a neck near their top and then shortly spread.

The family *Araucariaceae* is represented in Australia by the genera

Agathis and *Araucaria*. All species are tropical or subtropical in distribution, being denizens of the rain-forest.

Agathis robusta—Kauri Pine is distributed through near-coastal ranges in Queensland, and is scarce. The leaves average four inches long by one or two inches broad, and are parallel-veined, thick and leathery. The seedlings, however, have different foliage; at this stage the leaves are stalkless and average one inch long by ¼″ wide. The cones are reminiscent of those of cedars, 3 to 5″ long and up to 4″ in diameter, the scales are numerous and closely overlap, and being thickened at their ends project from the overall body of the cone in regular but rugged shape.

The species is a very stout tree 50 to 150 feet in height, having a very robust trunk branchless for the majority of its height, giving a long column and canopy appearance.

Agathis palmerstoni also grows only in Queensland with a more northerly distribution than *A. robusta*, the area moreover not being at all extensive. The leaves are similar to those of *A. robusta* but are smaller and narrower. The cones are also smaller and more oval. The shape of the tree follows the pattern set by Kauri Pine and, sometimes, this species is slightly larger.

There is another northern species, *Agathis microstachya*, which is presumably similar to the previous two, but details are difficult to discover in the literature.

Araucaria bidwillii—Bunya Pine is another native of the Queensland rain-forest, being restricted to a fairly small area in the south-east of the State. It is readily recognizable by its symmetry and dome-shaped crown, reaching up to 100 feet and more.

Leaves are in two forms, some being straight, narrow and ½″ to ¾″ long, others being lanceolate and about 1½″ long by ½″ to ½″ wide. Both forms are prickly and spirally arranged, although twisting of the leaf-bases in the larger flattened form makes them appear in regular alternate arrangement. The fruiting cones of this species are enormous, and superficially like pineapples in form. They are often up to one foot in length, and seven or eight inches in diameter, and commonly develop at the extreme top of the tree.

Araucaria cunninghamii—Hoop Pine has a greater range than Bunya Pine, growing in similar habitats in New South Wales as well as in Queensland. Its distribution, however, could not be said to be extensive. Apart from its finer foliage, the tree achieves a lesser degree of symmetry than *A. bidwillii*, and the branches appear to bear foliage in bunched or knotted growth.

Again, the leaves are in two forms, the one being lance-shaped or triangular, up to ¾″ long and sharp-pointed, the other shorter, crowded, overlapping and short-pointed. The cones are ovoid, about 3″ long and 2″ to 3″ in diameter. Regular indentations running laterally in the bark produce the hoop effect which gives the tree its name, but it should be noted that this characteristic has more emphasis in the Bunya Pine, at least in garden-grown specimens.

The family *Podocarpaceae* is represented in Australia by the genera *Phyllocladus*, *Dacrydium*, *Microcachrys*, *Pherosphaera* and *Podocarpus*. The distinguishing feature of the family is the absence of cones as ordinarily understood, the seed being solitary and borne either on scale-like bracts or on a fleshy coloured outgrowth from the seed stalk.

Phyllocladus asplenifolius—Celery-top Pine is restricted to Tasmania in

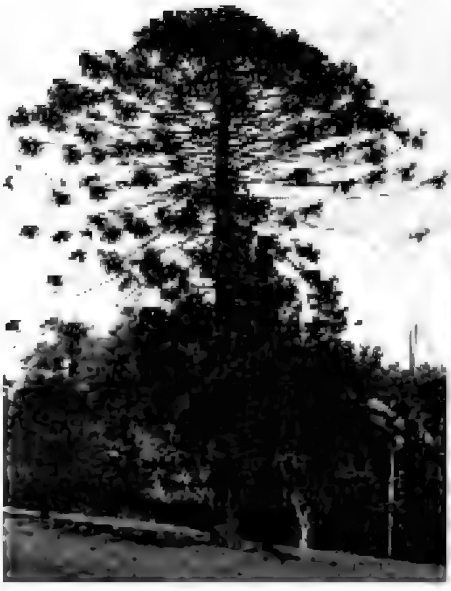

FIGURE 10—*Araucaria cunninghamii.*

FIGURE 11—Foliage of *A. bidwillii.*

FIGURE 12—Foliage of *A. cunninghamii.*

wet forest from sea level to 2,500 feet. Its occurrence is mainly in the western half of the island.

The leaves are straight, narrow and taper-pointed, but are only obvious in the seedling stage, being reduced to scales in the adult form when the leaf function is taken over by cladodes which spring from the axils of the scales. These cladodes are flattened, broad branchlets, rhomboidal in shape (almost diamond-shaped), but usually deeply cut. The seeding structures are borne directly on the cladodes and consist of a bract scale, a fleshy outgrowth called an aril, and the seed surmounting but eventually surrounded by the aril.

FIGURE 13—Foliage of *Agathis robusta*.

FIGURE 14—Foliage of *Podocarpus elata*.

The trees range about 60 feet in height, some specimens having both male and female flowers, some having all male or all female flowers.

Dacrydium franklinii—Huon Pine also is endemic to Tasmania, ranging through only the south-western portion of the territory of Celery-top Pine. This species grows about 70 feet high, and has two forms of leaf, the juvenile being straight, narrow and sharp-pointed, the adult about ⅛₀ inch long, sharply keeled on the outer surface, pressed close to each other and to the stem.

Male and female flowers are on separate trees, and the fruiting body is borne on the ends of the pendant branchlets. This body consists of a number of bract scales separated by internodes, and within these scales sit the ovuliferous scales and the seed. Although the bract scales and internodes are somewhat fleshy when ripe, the whole structure approaches a cone in form, if minute.

The discovery of fossil pollen of this or a closely related species in land masses through a wide arc of the Southern Ocean may be indicative of a wider distribution of Huon Pine in the early Tertiary.

Microcachrys tetragona, the only species of the genus, is also restricted to Tasmania. Its range is from the central plateau to the west and south-west, and it has a preference for exposed sites in wet sub-alpine areas, where it is a prostrate shrub with very small, closely-pressed, keeled leaves.

The seeding arrangement resembles that of the Huon Pine, but there is a greater aggregation of fertile scales as well as an increase in size, and this makes the approach to the cone form more obvious, despite the persistent fleshiness of the bract scales.

Pherosphaera hookeriana has a similar distribution to *Microcachrys*, and the foliage is not unlike that of the latter, although it is not as regularly arranged. It is, however, a densely branched shrub and about three to eight feet high.

Ovules develop on the upper surface of the bract scales, which are brown and aggregated, but few are fertile and the fruiting structure does not grow as large as in *Microcachrys*.

Pherosphaera fitzgeraldi is restricted to damp situations in the Blue Mountains, New South Wales, and is a low, much-branched shrub with looser habit than *P. hookeriana*. The leaves are about ⅛₀ inch long, keeled, with their inner surface white.

Podocarpus elata—Plum Pine inhabits rain-forest in near-coastal gullies in New South Wales and south Queensland. With favourable condi-

tions it can attain 100 feet, but is usually smaller.

The leaves are usually about 3" long by ¼" or more wide, lance-shaped with only a short stalk. The fruiting body consists of a swollen axis of the fertile shoot, surmounted by another berry-like body which envelops the seed.

Podocarpus spinulosus is called Native Plum in New South Wales. It is a shrub, densely branched, with unstalked leaves about one inch or more long. The seed is borne on a deep purple receptacle.

Podocarpus drouyniana is called Native Plum in Western Australia. It has flat linear leaves, two to three inches long by 1/16 inch wide, sharp-pointed, stalkless, and the edges are strongly recurved. The fruiting body is black and fleshy with pale-green seed.

Podocarpus lawrencei—Mountain Plum Pine grows in three states, New South Wales, Victoria and Tasmania, rarely below 4,000 feet. It is usually a low shrub, sprawling over rocks, but in sheltered forest can be a tree up to about 20 feet.

The leaves are stalkless, tough and blunt-linear, about ½" by 1/16". The seed develops within a greenish-black covering, which is supported by a red and fleshy development of the bracts around the stalk.

Podocarpus amarus Black Pine occurs in Queensland and has leaves averaging 3½" long by ¼" wide which taper to a sharp point.

Podocarpus parvifolius is a shrub or small tree with short, narrow, leathery, sharp-pointed leaves.

The family *Taxodiaceae* is represented in Australia by one genus, *Athrotaxis*, the three species of which are endemic to Tasmania.

Athrotaxis selaginoides—King Billy Pine grows from the central plateau to the west and south-west in cool rain forest, attaining a height of 80 or 90 feet. The leaves are ¼" to ½" long with a slight keel, are more or less pointed and lap over each other in an open loose fashion. The cones are rounded, about ½" in diameter, and are made up of many broad, thick scales.

Athrotaxis cupressoides—Pencil Pine grows in the same regions as King Billy Pine, but is a shorter tree with the leaves shorter, more closely pressed and more strongly keeled. The cones are also smaller.

Athrotaxis laxifolia is rare and grows as isolated trees in company with the other two species. Being intermediate in form it has been thought by some to be a hybrid.

The author is indebted to several members of the Botany Group for advice, suggestions and corrections, and hereby expresses his sincere appreciation.

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Bush Brushes

The fox's brush was the traditional trophy of the chase. The Field Naturalist usually returns from an excursion into the bush with a different sort of "tale". If you have one worth mounting and preserving send it to the Assistant Editor, "Victorian Naturalist", 102 Murray Road, East Preston, N.18, Victoria.

Swimming of Bats

The paper on bats by McKean and Hall in the *Vict. Nat.* 81 (2): 36 has prompted Elery Hamilton-Smith of Montmorency to send the following notes for these columns.

While hand-netting *Miniopterus schreibersi* for banding purposes during the evening emergence from the efflux of Duke's Cave, Buchan, on 24th November, 1962, one specimen was knocked into the water. It lay on the surface briefly with wings and tail membrane fully extended, then swam smoothly and rapidly for a distance of some eighteen inches, using what can best be described as a bat version of the butterfly stroke.

At the end of this distance it took flight from the water surface, apparently without difficulty. This greater ability than that reported in *Nyctophilus geoffroyi* can be readily compared with the much stronger and faster flight of this species in normal circumstances.

It is perhaps also worth noting that swimming has been reported previously in a number of species by Ryberg in *Bats and Bat Parasites* (1947), and by Borell in a paper in the *Journal of Mammalogy* (1937). The latter showed also that certain species were capable of swimming but not of taking flight from water, while others could take flight. On the other hand, Ripley, also in the *Journal of Mammalogy* (1960) has reported the inability of flying foxes to swim, describing how they floated on the sea until carried ashore by a rising tide.

Eucalyptus rubida and E. dalrympleana

The following note on the field identification of these two similar species has been sent in by Miss Jean Galbraith of Tyers.

Probably most of us who are interested in eucalypts have at one time or another looked for a field distinction between *Eucalyptus rubida* and *E. dalrympleana*.

The latter is normally a tall forest tree in cool or high rainfall areas, whilst the former is relatively less tall and grows in sunnier places, but there is no clear-cut distinction in this respect. *E. rubida* has leaves with straight margins and *E. dalrympleana* has wavy edged leaves, but I do not know whether this character is invariable. The juvenile foliage of *E. dalrympleana* is very glaucous, while that of *E. rubida* is dull but not glaucous—but one cannot always see juvenile leaves.

I was very pleased therefore when a fellow member, Mr. K. C. Rogers of Black Mountain, pointed out the decided difference in overall foliage colour of the mature trees. I have not tried this means out except at Wulgulmerang, but here the tops of *E. rubida* are dull green and those of *E. dalrympleana* are a bright yellowish green.

Superb Greenhoods

These observations on one of Victoria's most uncommon orchids come from Mrs. Ellen Lyndon of Leongatha.

On the coastal plain, near the road that leads from Kongwak across to Outtrim and about two miles from the former village, we found Superb Greenhoods (*Pterostylis grandiflora*) growing freely in company with Nodding Greenhoods (*Pt. nutans*) and Autumn Birds (*Chiloglottis reflexa*). They occurred amongst bracken in rather open second growth messmate-peppermint scrub. The tallest plants were nearly a foot in height, but the average height was much less. Some plants were scattered through the ferns, but there was one closely-spaced colony

of perhaps a dozen plants growing on an old track.

J. H. Willis, in *A Handbook to Plants in Victoria*, notes that these orchids are "occasional in near-coastal districts east from Port Phillip, where now very rare or extinct . . .". C. Barrett, in *Gems of the Bush*, also notes this orchid as comparatively rare.

It may be a good season for these orchids and every effort will be made to check on their range and numbers.

[Because of the great interest shown in the family *Orchidaceae* by many naturalists, the editors are pleased to introduce a new feature article. This will deal with **Victorian Orchids** and will parallel the popular **Australian Wattles** series which has been running for some time. The first article in the new series appears on *page 116* of this issue.—R.H.J.McQ.]

Aboriginal Quarries

The following note has been sent in by Mr. G. A. Crichton of Alexandra. Owing to the fact that the area has not yet been properly surveyed by authorities in this field, the actual location of the quarries will not be indicated.

Not far from the Delatite River in northern Victoria, there are two sites reputed to have been aboriginal quarries.

Each of these is a stoney outcrop on a rather steep incline. Although there is some evidence of excavation, the quarries consist principally of heaps of stone. The excavations could have been made by gold-seekers as there is ample evidence of their activity throughout the area.

The quarry-stone is a greenish-coloured intrusive material, very hard and fine-grained. There are many outcrops of the same stone in the district, but apparently no others show the fragmentation found at these two sites.

On the quarries themselves, there are fragments of stone down to the very smallest particles, but none of these show the distinctive conchoidal cleavage so typical of the flakings about middens. However, pieces with this characteristic were to be found in well-defined deposits about the edges of the quarries. It would seem that likely pieces were broken out and then removed to a more comfortable site for further fashioning.

The first of these outer-lying deposits was found where a recent poison furrow had exposed plentiful flakings and discards. Working with this observation as a basis, "workshops" were also found about the other site. Here the flakings were only lightly covered and had little soil amongst them. On one of these deposits, the "rough" of an axe was found and also another hand artefact with partly-ground edges.

A Harvest for Insects

The following note comes from Mr. K. C. Rogers, a Club member living at Black Mountain in north-eastern Gippsland.

During dry summer weather on the tablelands of East Gippsland, it is quite usual to find a copious sprinkling of "manna" under certain species of smooth-barked eucalypts.

The leaves and branchlets of these trees exude a transparent substance that falls to the ground in drops as a sugary liquid. This soon congeals into the familiar white manna, so pleasant to the taste.

In the Wulgulmerang district, at elevations between 2,500-4,000 feet, manna is usually only abundant under Candlebark Gum (*Eucalyptus rubida*) and its near relative, Mountain Gum (*E. dalrympleana*). On this tableland, another member of the same group, the well-known Manna Gum (*E. viminalis*), seldom sheds manna, despite its name.

However, on January 4 this year, during a visit to the Suggan Buggan River, a few miles to the east and where the elevation is only 1,100 feet, it was at once noticed that the tall, straight Manna Gums lining the river were actually dripping manna. The bark and litter under the trees was spattered with the liquid, which was congealing into white blotches over everything. The substance appeared to be coming from the higher leaves and branches, and was flowing down the trunks of the trees.

It was a veritable harvest for insects. Lining each sugary rivulet were numbers of the large black cicadas—part of a great swarm then in the vicinity. With them were bees, butterflies, and many smaller insects, all feasting on the great flow of manna.

Some Notes on Babblers and Choughs

By Roy Wheeler

There are four species of Babblers (*Pomatostomus* sp.), the Apostle-bird or Grey Jumper (*Struthidea cinerea*) and the White-winged Chough (*Corcorax melanorhamphus*) which all belong to the community groups of Australian birds. They are most distinctive families about which very little is known. The Babblers move about in small parties of up to a dozen birds and are very local, living in the same areas for years. The Apostle-birds of the drier inland areas also move about in small groups, but their colonies are much more extensive than those of the Babblers. The Choughs will merge into parties of up to 60 birds or over in the winter months, but break up into smaller groups in the breeding season. Strictly living in communities, feeding together, sleeping together, nest building together and caring for the young together, each individual bird shares in the community life of the group.

During two holidays at "Lyal Glen", the property of the Hon. Secretary of the Bendigo Field Naturalists, Mr. John Ipsen, at Lyal about six miles from Redesdale and on the edge of the Kimbolton State Forest, I spent some time watching two of these community species which occur in the district, the White-browed Babbler (*P. superciliosus*) and the White-winged Chough. During my first holiday in May 1963 the party of Babblers, which included four birds, kept more or less to an old deserted orchard nearby with only occasional visits to the house block. Several of their bulky stick nests were to be seen in trees on the block but were not visited. Several nests in the old quince trees in the orchard were in use as roosting nests, and they were constantly being repaired and relined, as almost every time the party was observed, one bird had a stick or other material in its beak. On the second visit in April 1964, the party had increased to eight birds, and was about the house and block several times a day, playing "follow the leader" and always following the same route—from their base, a big old plum tree near the front gate, on to the Red Gums along the creek, into a wattle tree, on to a large Yellow Gum around the dam and back to the plum tree. This plum tree was their shelter tree in the case of alarm, for they fed quite a lot beneath the road trees and the grass in the house block and at the slightest hint of danger flew to the tangled branches of the plum tree, where they sheltered. After the "all clear" they would be back feeding again. As they moved through the trees a constant low chatter could be heard, the leader's head would peep out from amongst the foliage and seeing all was well, would fly on to the next tree, followed at intervals by the rest of the group. Follow the leader around the block and back to the plum tree. Another circuit took them down the creek and through the old orchard and back again. Again nests were being constantly repaired and a new nest being built, and two of these were used as roosting nests each night. One evening I witnessed a strange (to me) performance as the birds were feeding by the roadside just prior to their retiring for the night. In a small depression or rut on the roadway two

White-browed Babbler at Nest.

birds would sit and spin in a clockwise motion, another would join them, one would leave and the remaining two would spin around for about a dozen times before another took its place. From first appearances it looked like the domestic hen having a dust bath, but these birds were not dusting, they were spinning. The performance kept up for at least ten minutes until a car disturbed them. The hole in the road was about an inch deep and about 4 inches across. Sometimes as many as four birds tried to join in, but the spinning was performed by only two at a time. It was possible that the whole eight birds took part.

The White-winged Choughs kept mostly along the roadway at the entrance to the property and roosted each night in the large Yellow Box and Red Gums nearby. On both visits the party numbered from 30 to 40 birds, and their foraging took them much further afield than the Babblers, for they were often seen a mile or so away from their home area. Several old nests were to be seen in and around the property, large and very obvious mud bowls, usually placed on a bare horizontal branch at about 30 feet. The Choughs mainly fed on the ground, moving about together, the tails moving up and down and if an alarm note was heard, immediately with one accord they flew into the nearest trees. One day whilst watching them feeding in a nearby paddock, one gave an alarm and they all flew across the road into the house block trees. I couldn't see anything to alarm them until I swept the paddock with the field glasses and there, at least half a mile away, was a fox sneaking along a fence. The fox must have noticed me for it turned back and the birds returned to their feeding. Their calls vary from a rasping chatter to a rather flute-like note.

In November 1963, when on a short visit to the block prior to the Bird Observers Club visit, I found two young birds, not long out of the nest and unable to fly, being cared for by a group of eight birds. Magpies were continually swooping at the party, and it appeared as though a constant battle was in progress. The young birds were against a wire fence for protection. Miss Ina Watson and Miss Margaret McKenzie visited "Lyal Glen" on Australia Day week-end (January 1964) and they found a bare space on the ground about 2 feet in diameter where the ground was scored into cracks 3 inches deep by about half an inch wide and from 3 to 6 inches long. The soft dry dust was covered in foot-prints and was the work of the Chough (see *The Bird Observer*, No. 387). Miss McKenzie thought that it might have been a way to provide dust for a dust bath. However, in April 1964, after heavy rain, I found the same patterns on the ground both on the block and in the forest nearby. It appeared to me that where the ground had cracked in the dry weather the birds had enlarged the cracks, forming a series of grooves up to three inches deep and up to an inch wide and at times over a foot long over an area of about a square yard. Perhaps some reader may be able to throw further light on this apparently Chough habit and its purpose.

Finally a word of warning regarding the Grey-crowned Babbler (*P. temporalis*), once a common bird in central Victoria, the Wimmera and other parts of the State. On a recent visit to Edenhope, in the west Wimmera, I learned that this bird, once common in the district, had now almost completely vanished. Once common in the Mornington Peninsula and the Melton district near Melbourne, it is now rarely

seen. A few birds still inhabit the Woodlands golf course near Mordialloc, a few were recently seen, after an absence of several years, at Lascelles Dam, near the You Yangs. The advance of civilization with all the dangers it brings cannot be withstood by some of our birds, and apparently the Grey-crowned Babbler is one of these. It is disappearing at a fast rate and becoming rare in a State where it once was regarded as common.

The Grinding Rock at Earlston

By Aldo Massola

Early in October 1836 the explorer Major Mitchell traversed the country slightly to the north-west of the present site of Violet Town.* It is from his beautifully descriptive pen that we know the district was then a "level forest country. The wood throughout the forest consisted of the Box, or Goborro, species of Eucalyptus." We read further that "the forest country traversed by the party this day was in general grassy and good, and was open enough to afford a prospect of about a mile around us". The next day the Major encountered several chains of deep ponds, and encamped on the banks of a running stream, in which were also some deep ponds "and which from some flowers growing there, were named by the men Violet Ponds".

As a result of this description the district was soon colonized, and it is little wonder that when, in January 1840, the first sale of land at "Violet Creek" was held (in Sydney) the half-acre allotments were snapped up. "The site for a Village for the benefit of the overland travellers", had been selected by the Colonial Secretary in September 1839, and "Violet Creek" was expected to become only second to Melbourne in importance.

*Earlston is 8 miles north-west of Violet Town.

Mitchell, of course, was not the first white man to travel through this district. Some years previously, in 1824, the Hume and Hovell party had come through a few miles to the south-east of his route, and had also spoken highly of the country. Both parties, however, had some trouble with the natives, who appeared to be warlike and numerous.

The forests and the aborigines have long since disappeared; but whereas the removal of the trees left extensive and well grassed plains, the removal of the aborigines left hardly a trace of their former occupancy of these plains. Originally numbering over a thousand people, the Taungurong were subdivided into a number of groups, or sections, the one inhabiting this district being known as Yuungallum. At the beginning of settlement the Taungurong gave some trouble, and a number of white men, as well as many of the natives, were murdered. Later on, however, they gave excellent service in the employ of the settlers.

It is incredible that such a numerous tribe, who must have occupied the country for a considerable time, should barely leave a trace of their former presence. Yet with the exception of some lists of words, a few place names, and two rock water-holes

Carston Grinding Rock

(gnamma holes), situated on the Benalla-Yarrawonga Road, no relics of these people are known to exist. It is for this reason that the recent report received from Mr. A. W. Walker, of Essendon, of the existence of a grinding rock was investigated with alacrity.†

Grinding rocks are outcrops of abrasive rock, such as sandstone, and were used by the aborigines in order to grind a sharp edge on their axes. They may be recognized by the grooves worn into them by the harder stone of which the axes were made, the soft sandstone wearing more quickly than the hard axe-stone.

Grinding rocks must be differentiated from grinding stones. The former are immovable rocks, while the latter are pieces detached from larger blocks or outcrops, and traded by the tribes on whose territory these occur, with tribes who are less fortunate in this respect. A good example is the trade which was carried on by the St. Kilda natives, who exchanged beach-front sandstone with the Mt. William people, or by the Grampian people who traded sandstone blocks with the Murray tribes.

Tribes possessing grinding rocks were able to obtain axe blanks, i.e., unfinished axes, from the tribes on whose territory there were deposits of diorite and other axe-stone, and, after grinding them to a sharp edge, would advantageously trade them with tribes who had neither the axe-stone nor the sandstone.

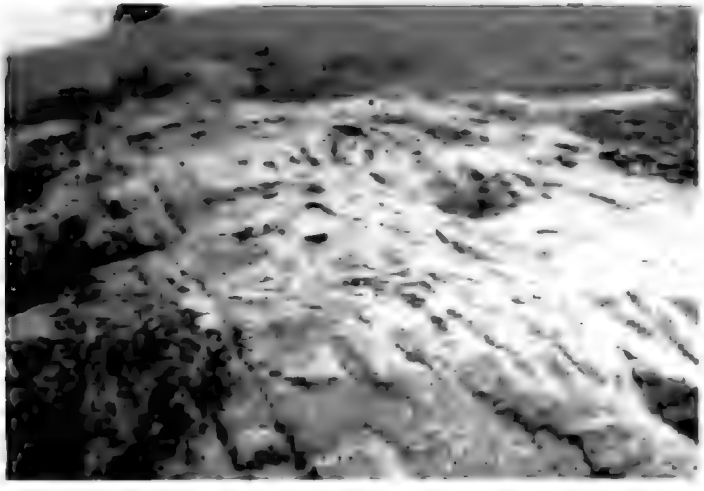
At times both these stones were available in the territory of one tribe, such as at Gellibrand, which, of course, was a tremendous advantage to the tribe concerned.

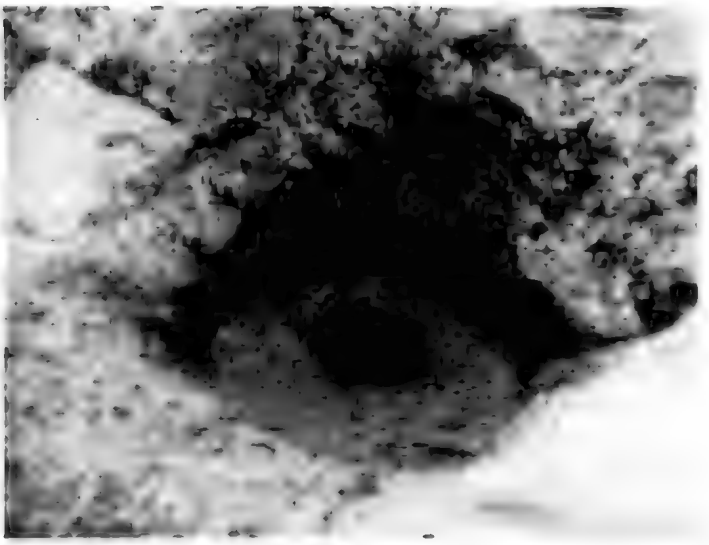
† I was accompanied on this trip by Mr. J. H. Pollitt, of Melbourne.

The grinding rock at Earlston is an outcrop of fine-grained sandstone, situated on the southern slopes of a low hill, locally known as Murphy's Hill. The rock measures about 20 feet in length by 10 feet in width and runs in an east-west direction, only protrudes a few inches above the ground, and presents a relatively flat surface. On this flat surface about 90 grinding grooves are visible, thus affording ample evidence that it was used by the natives for stone-sharpening purposes. However, the grooves only range from 3 inches to 5 inches in length, and only from ¾ of an inch to 1¾ inches in width, and are about ¾ of an inch deep. Judging by the narrowness and by the angle of the grooves, which, although weathered, can be clearly examined, the implements edge-ground, or sharpened, on this rock had a narrow cutting edge, and were not the ordinary stone axes commonly found all over Victoria. There can be little doubt, therefore, that the implements ground were the long and round-sectioned hand-axes which are so often found in north-central Victoria.

These axes are characterized by their lenticular form, and by having a round, or round-oval, cross section. They were made from suitable pebbles, pecked, or hammer-dressed, to shape and ground to a fine edge at one end. This edge, because of the lenticular shape of the axe, is much narrower than the centre of the axe, and conforms to the size and shape of the grooves on the Earlston grinding rock. Although both these pecked pebble axes and the coroid axes (i.e., axes prepared from quarried lumps, detached from outcrops, knapped and flaked into shape prior to grinding; they generally have a much wider cutting edge) are commonly found in north-central Victoria, the lack of distribution maps precludes the possibility of determining the greater prevalence of either of the two types in any given locality.

The finding of this grinding rock, with such narrow grooves, pinpoints the centre of an industry. We now





know the type of axe made by the Taungurong at Earlston.

On the southern side of the Earlston outcrop there are two man-made cavities worn into the sandstone by chipping and rubbing with some harder material. The holes thus formed measure approximately 18 inches in diameter by 12 inches in depth. At the bottom centre of each there is a smaller cavity, about 3 inches in diameter and 4 inches deep. Each hole holds about 3 gallons of water, which was, no doubt, used to assist the grinding process.

In the immediate vicinty of this grinding rock there are two other sandstone outcrops, which, however, bear no grinding grooves. That these two outcrops were not used by the aborigines may have been due to the poor quality of the sandstone, which, being heavily veined with harder impurities, would have interfered with the grinding.

The natives' camp was probably situated close to Murphy's Swamp, about half a mile to the south of Murphy's Hill, one of a chain of such swamps stretching between Broken River to the north and Stoney and Honeysuckle Creeks to the south. This chain of swamps could have been one of the several noted by Mitchell, and described by him as a "chain of deep ponds".

The correctness of Mitchell's description was borne out by Mr. J. H. Bradshaw, the present owner of the property on which the grinding rock is situated. He stated that when, in 1876, his father occupied the land, it was heavily timbered with Box trees, and the swamps were teeming with ducks, swans, and other water birds. Mitchell also mentioned emus and kangaroos. Because of this abundance of food, and as the swamps would form an easy route between the permanent water of the river and creeks, this locality would indeed have been a favourite spot of the Taungurong.

How to Look at a "Rock Section"

by D. E. McINNES

In the March *Victorian Naturalist* instructions were given on how to make your own rock sections, and a package of materials sufficient to make half a dozen slides was offered to members to help them get started on the interesting hobby of seeing of what rocks are made. The venture had quite good results. More than fifty packages were sold to members and odd parts to other members. As a further result the Hawthorn Juniors intend to have a working exhibit in the next Nature Show, demonstrating how to make a rock section.

Now, knowing that there have been plenty of rock sections made by members, these suggestions may be useful to enable further information to be gained from these rock sections.

A section of rock mounted on a slide can be viewed in several different ways through a microscope, including our F.N.C.V. microscope, and each method helps to show up the crystals of minerals that make up a particular rock. The crystals will show up in different ways with the various methods of observation and various features of the minerals will be seen with one method and other features with other methods.

What are the features we may see in crystals forming our rock section? It will be best if we run through the different lighting methods and note the features possible for each method.

Let us assume that you have made a section of granite (granodiorite) and also a section of basalt. What can we see in the two slides?

Set microscope up for low power, about 20X.

First Method—Bright field illumination.

Features that may be seen are:

(a) Crystal form, the outline or part may be seen.
(b) Colour is sometimes shown by minerals.
(c) Opaqueness: a few minerals are opaque and are better viewed by other methods.
(d) Alteration: some minerals will show a more or less cloudy effect.
(e) Inclusions: these, for example, bubbles or other minerals are seen in various minerals.
(f) Cleavage lines: minerals when thin in section tend to crack along the crystal sides and parallel irregular lines are seen.

Place your granodiorite section on the stage. Now granodiorite is composed of the minerals quartz, felspar and the black mica, biotite. What can we see? First, the patch of yellow colour; this is the biotite and in it may be seen straight lines (cleavage lines) and perhaps some inclusions. Next, patches of cloudiness; these are the felspar crystals, perhaps some crystal form can be seen. Then the remaining crystals are probably quartz, clear with maybe a line of small bubbles or an inclusion of small crystals.

Try your basalt slide. Basalt is composed of olivine, augite, felspar and magnetite. What do we see this time? First, a large number of small opaque

spots somewhat square or ragged; this is the magnetite. Look to see if there is any colour, a pale brown may indicate augite. What about crystal forms? There are plenty in this slide, most of them shaped like narrow straight sticks. These are felspar crystals. Some six-sided shapes without colour are olivines or with a reddish colour are altered olivines. Look at the olivine crystals and notice the irregular fracture lines, often showing signs of alteration along these lines. The felspars may show straight cleavage.

Second Method—Dark Ground Illumination.

Alteration (cloudiness) in the granite slide will be quite striking.

Inclusions and colour will show up in a way quite different from the bright field method, and the various crystals are more apparent. The dark ground method, although not stressed in petrology books, will make rock sections most interesting to the beginner.

Third Method.—Top lighting is used to examine opaque minerals, so use it to look at your basalt slide. Now the magnetite shows up alone, with a dark metallic sheen and the surface is quite pitted. (Try a higher power.)

Fourth Method.—This method is to use plane polarised light. To do this a polarising disc must be placed between the light source and the rock section. In the F.N.C.V. microscope, arranged for bright field illumination, place one polaroid disc on top of opal slide. The depth of stage will allow the rock section to be put on the stage without touching the disc.

The polaroid disc has the effect of only allowing the light to pass through in one vertical plane. A simple comparison would be as though the light passed through the teeth of a fine comb. Now certain coloured minerals have the property of allowing the light to pass when parallel with the light rays but absorb the light when at right angles to the plane of the polarised light. This property of the minerals is called "Pleochroism".

Such a mineral is biotite, so let us look at our granite slide with plane polarised light.

First notice that some of the biotite crystals are now dark and some light. Now revolve the slide around, keeping a particular biotite crystal in the centre of the field. You will see that in one position the colour is quite bright, but at right angles to that position the light is completely absorbed.

It is interesting to note here that this is the principle of your polaroid disc. It is composed of minute crystals that are all lined up in one direction and pass the light through in one plane but absorb it in the plane at right angles.

A revolving stage top that will keep your slide in the centre of the field while being turned around would be a great asset. See what you can do.

Pleochroism is a means of identifying several coloured minerals. Try your basalt slide. Some forms of augite are slightly pleochroic.

Fifth Method—Crossed Polarised Light.

To attain this method, in addition to the disc giving plane polarised light, another polaroid disc needs to be placed anywhere between the rock section and the eye. The disc can be placed just on top of the eye piece but the best place is to unscrew the bottom lens of the eye piece, insert the disc flat and replace the lens.

What happens now? Without any slide, look down the microscope and while looking, slowly revolve the eyepiece only; note that in one plane the light is not affected but in a position

at right angles the light is absorbed or nearly so, only a blue tint showing. This is when the polarisers are crossed.

Leave polaroids crossed, take the granite slide and first put it under the microscope so that only the glass slide is seen and no rock section—notice that nothing happens. Now push the rock section into the field and we see a riot of colour. Why do we see colour? Well, all that can be said here is that some minerals when seen with crossed polaroids cause interference to the light waves and this interference is seen as various colours by the eye. The colour is determined by the position of the crystal, the particular mineral and, thirdly, the thickness of the section.

Try this experiment. Obtain some cellophane and with crossed polaroids look at a single thickness. Revolve cellophane and notice that at one position, colour is seen brightest. Now in that position, line up two thicknesses of cellophane and observe the colour. Try three layers—what do you see? Three different colours, and if you twist the cellophane pieces around relative to one another you will see a variety of colours. All this is to show that colour alone is no indication of a certain mineral. Quartz will look grey, yellow, red or blue, depending on the thickness of your rock section.

What features can we expect to see when we look at our rock slides with crossed polarisers? First, the colour. This would be a help in identifying minerals if the section is of the standard thickness, 30 microns (0·03 mm.) but otherwise it makes a thing of beauty and defines the boundary of the crystals.

Now revolve the slide and you will see that the colour disappears from any particular crystal every 90°. This is called "Extinction" and by measuring the angle from a definite crystal side or cleavage line to the position when the crystal is dark will give the "Extinction Angle", which is an important character of certain minerals.

Another aspect to notice is that the felspar crystals will usually show a definite division into two or many parts and that the parts show extinction at different angles; while half the division is light the other half is dark. This is an indication of twin crystals.

If the twinning is multiple, the felspar is called Plagioclase Felspar, and if just simple, it is probably Orthoclase Felspar.

See if your granite section shows both types.

A further interesting feature may be seen in the felspar crystals. This is called "Zoning". As a crystal is cooling from the molten state the composition gradually changes and this will be seen as a series of lines around the crystal shape that outline the formation of the crystal.

One more point—look carefully at the junction of two crystals or the mountant and a crystal—there is usually a bright line that moves to or from a crystal when the objective is raised. This is an indication of difference of refractive index which again is a help in finding what mineral it may be. The bright line moves to the mineral with the higher refractive index when the objective is raised. A higher power objective is preferable when trying this.

Examine the basalt slide. Notice the olivine crystals show most colour and the felspar lathes usually appear as multiple twins. Revolve the slide and see the extinction in the felspar. You may see zoning in an augite crystal.

Well, this is enough to show that your rock sections can be full of interest. These notes are only to give a very elementary idea of rock sections under the microscope, and if your

interest is aroused and you would like to know more of the theory and practice of this procedure, a very good book to have is *Minerals and the Microscope* by H. G. Smith, revised by M. K. Wells. (Price 20/9 retail.) This will tell you all you need to know except one thing—that is, how to make a rock section slide, but you already know that. It's easy, isn't it?

Victorian Orchids—No. 1

Banded Greenhood—*Pterostylis vittata*

By J. N. and W. H. King

The Banded Greenhood, although relatively rare, has a considerable range throughout the State. It is found growing in well-drained sandy areas of coastal and Mallee heaths and light forest. Last year, this unusual greenhood was growing prolifically in the Little Desert, south of Nhill, and already this year has been reported from Anglesea and Frankston.

Banded Greenhood, *Pterostylis vittata*.

Although somewhat stouter, the plant is very similar in appearance to the better known Tall Greenhood (*Pterostylis longifolia*). The nodding flowers may be from one to ten in number and are a greenish or purplish brown colour with many prominent brown bands over the hood. The flowers also possess a very sensitive tongue, a characteristic of many greenhoods.

The flowering stem varies from 6-15 inches in height and has no basal rosette, although flowerless leaf rosettes may be present. This flower-stem bears many broad, pointed leaves, and leaf-like bracts project beyond each flower.

The flowering season is from late autumn to winter. The specimen illustrated was found early in June last year, growing in coastal heath-land on the eastern side of Port Philip Bay, where although apparently localized, the orchid was fairly abundant.

Eucalyptus aggregata in Victoria

By Patricia M. Carolan

About ten mature trees, 30 to 40 ft. tall, and probably a few young saplings (or sucker growth), of *Eucalyptus aggregata*, a species not previously recorded in Victoria, occur about one mile south-east of Woodend station, beside the railway embankment.

The bedrock of the area is Ordovician sandstone and shale, but the actual site is low lying and partly covered by alluvium from a small creek. Drainage is poor and the soil was waterlogged in May this year.

Other trees in the immediate vicinity are *E. ovata* (Swamp Gum), *E. radiata* (Peppermint) and *Acacia melanoxylon* (Blackwood), but the peppermints are on slightly higher ground. The *E. aggregata* have a bark somewhat similar to the peppermints but darker and rougher, extending to the small branches. The leaves are small, narrow (largest about 10 x 1·5 cm.), and rather thick, with a slightly bronze sheen, somewhat resembling *E. stellulata* at a distance, but the longitudinal veining of the latter is very different. The fruit (only

Eucalyptus aggregata growing near Woodend.

about 3 x 5 mm.) is particularly distinctive, broader than long, with wide open valves which are usually three or four, but occasionally only two.

E. aggregata has a widespread distribution on the southern and central tablelands of N.S.W., and Blakely gives some scattered localities in Tasmania. However, Johnson believes the Tasmanian populations to be a different species and has renamed them *E. rodwayi*.

Woodend's climate would be about the middle of the range covered by the N.S.W. localities quoted by Blakely, which extend from Cooma to Orange. All have a comparatively uniform seasonal rainfall distribution, cold winters with frequent frosts, and the driest (Cooma) has the coldest winter. There is a remarkable correlation between Woodend and the furthest north locality, Orange, 400 miles away. Both towns have mountains (Macedon and the Canobolas respectively) nearby.

However, frosts would be more severe at many of the N.S.W. localities. The absolute minimum recorded at Orange is 12°F. and at Cooma 11°F. The lowest ever reached at Kyneton is 21°F.

	Woodend 37°22'S. 144°32'E. Altitude 1850 ft.	*Orange* 33°17'S. 149°05'E. Altitude 2846 ft.
Average Annual Rainfall	32 in.	31 in.
Mean Temperature, July	43°F.	41°F.
Mean Temperature, January	65°F.	68°F.
Wettest Month	June*	June
Driest Month	February*	February

* The monthly distribution is taken from Mt. Macedon (3 miles away) as Woodend figures are not available.

There may well be other occurrences of *E. aggregata* near Woodend and elsewhere in Victoria. A zone extending from Lancefield to Kyneton, Daylesford and Ballarat would have a similar climate. Apparently the most likely places are small depressions (frost hollows) with bad drainage.

I would like to acknowledge gratefully the assistance of Mr. J. H. Willis in examining specimens and checking these notes.

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Field Naturalists Club of Victoria

General Meeting—July 13, 1964

About 140 members and friends were present. After opening the meeting, the President, Mr. M. K. Houghton, referred to the death, on June 17, in his 82nd year of Mr. Tarleton Rayment. Mr. J. H. Willis spoke in appreciation. Mr. Rayment had been a good general naturalist of the type that in these days of increased specialization was becoming rare. Whilst still a boy, his interest in bees had been aroused when, on a visit to the country, a farmer had shown him two hives and, pulling out some combs, had explained how the bees worked. More than forty years ago he had earned renown as an apiarist, a prolific writer and a gifted artist. Amongst his best known works were *A Cluster of Bees*, published in 1935, and the novel that won in 1936 the All Nation Novel Competition, *The Valley of the Sky*. During the war Mr. Rayment had worked on the malnutrition of bees. He contributed articles on bees and wasps to the *Victorian Naturalist* between 1946-53 and was awarded the Natural History Medallion in 1951. He concluded his term of office as President of the F.N.C.V. for the year 1955-6 with an address on "Dimorphism in Halictine Bees". Mr. Rayment's wife and only son had predeceased him, and for some years Miss Lynette Young had looked after him. Many of the older members of the F.N.C.V. would mourn the loss of a friend and a great naturalist and wish to extend their sympathy to Miss Young.

Members stood in silence whilst a coloured picture of Mr. Tarleton Rayment was projected on the screen.

Mr. Len Robinson gave an interesting account of an expedition that he and Mr. Don Taylor had made in October last year to the Eyre Peninsula, the Gawler and the Flinders Ranges. This was illustrated by numerous fine colour slides of the birds, flowers and scenery of the areas visited and by a colour film made by Mr. Taylor, who came up from near Warrnambool to assist with the projection. They had visited an island in Venus Bay to photograph Rock Parrots at their nest under a slab at the top of a limestone cliff, and had obtained good shots of Sooty and Pied Oystercatchers and a Caspian Tern. Returning to the Eyre Highway they had camped for five days in the bush north of Minnipa. Here in mallee country they had found Crimson Chats and Budgerigars numerous. The former had been difficult to capture on film, but their efforts had been successful. Many fine pictures were also obtained of nesting Budgerigars, Major Mitchell's, Cockatiel, the well-camouflaged Little Quail, Rufous Treecreepers and many other birds. Just before breaking camp they had found a 4-inch scorpion. Further in the Gawler Ranges birds had been less numerous, so they had returned through Port Augusta and proceeded through Hawker into the Flinders Ranges. The scenery there had been most impressive, and they had found many subjects for their camera. Galahs had been present in large flocks among the Red Gums on the creek banks, and Little Corellas and Elegant Parrots were also photographed.

In answer to a question from Mr. J. Baines, Mr. Robinson described briefly the expedition that he had made with Mr. David Morgan and others when the Eyrean Grass-wren had been rediscovered on the Macumba River to the north of Lake Eyre.

Mr. Eric Allan moved a vote of thanks to Mr. Robinson and Mr. Don Taylor for their excellent contribution, and this was carried with acclamation.

The President reminded members that the August general meeting would be the last before the Nature Show, and called for volunteers to stage the exhibits on August 30 and man them during the following three days. Mr. McInnes appealed for owners of station-wagons and utilities to assist in transporting the exhibits to the Lower Town Hall on August 30.

Mr. Coghill announced that Mr. Baines had agreed to be the Secretary of Natural History Medallion Committee, and that Mrs. Thistle Stead had accepted an invitation to attend the November general meeting to receive the 1963 award. Mr. Taylor had undertaken to distribute copies of the *Naturalist* to booksellers. He pointed out that there were still two positions which it was urgently necessary to fill. He would like to hear of a member who could undertake regularly the duties of Assistant Secretary. These entailed the writing of minutes of the General and Council Meetings. The Club also needed someone to look after the blocks of illustra-

tions in the *Naturalist*. After use, blocks had to be cleaned, greased and indexed so that they could be found again easily when required. Mr. Ros Garnet had made great progress, but Council would like to find someone to continue this work.

The Science Teachers Association of Victoria had notified that it was holding its 21st Birthday Celebration in the Exhibition Hall, and the Bendigo F.N.C., in forwarding a copy of its programme, had invited any members visiting Bendigo to attend its meetings.

Following the resolution at the June meeting, Mr. Coghill had written to the M.L.C. concerned on the subject of the destruction of seals, but had received no answer. He had also written to the Premier, who had replied that the matter had been referred to the Chief Secretary and to the State Wildlife Reserves Investigation Committee.

The new members listed on page 91 of the July *Naturalist* were elected.

Several interesting Nature Notes were given. Mr. F. Curtis mentioned seeing a Cockatiel in the garden. Mr. J. H. Willis reported on the rediscovery of the rare phalloid puffball, *Mutinus caninus*, in the Portland district. Mr. H. Stewart pointed out that the extensive destruction of old, dead trees meant the disappearance of suitable nesting sites for many species of parrots, kookaburras and other birds. Mr. McInnes reported that in spite of the action to destroy the weeds in Albert Park Lake, there was still plenty of pond life in the lake to interest the microscopist. Samples of copepods and winter eggs of *Plumatella* were shown under F.N.C.V. microscopes.

Other exhibits on the table were a further collection of photographs of wildflowers coloured by the late Mr. Fred Bishop, shells from Gunbower Island lagoons, male and female Mouse Spiders (*Missulena occatoria*), the Quivering Fungus (*Tremella foliacea*) that grows on dead trees, and leaves and buds of *Eucalyptus aggregata* from Woodend. Mrs. Bennett spoke on a specimen of wood with borer scribbles visible on the surface after removal of the bark. One of the late Mr. Tatleton Rayment's books, *Eagles and Earthlings*, was also on the table.

Geology Group—July 1, 1964

Thirty-five members and visitors were present, with Mr. L. Angior as chairman. Mr. R. Hemmy reported on the Group's excursion to Bulla and the Organ Pipes

at Sydenham on June 7. Some twenty-five members attended, with the first stop at the picnic ground at Bulla. The party moved along the river valley to view granite decomposed to kaolin, which is being exploited commercially. A fine example of xenoliths in the granite was carefully examined and photographed. Much interest was taken in the old bridge carrying the road across the river, as it is a classic example of early stone construction. The excursion then proceeded to the Organ Pipes, via Keilor. After a thorough inspection of the Pipes, the party proceed upstream to examine other formations, including a pavement formed by basalt. Silurian deposits were searched for graptolites without success.

Messrs. Wigmore and Davidson explained the formations revealed in an excavation at the new Spencer Street railway station. Using a plan of the formations, the Older Basalt flows were traced and their effects noted on the clays in the contact zones.

A letter from Mrs. Cheslin, relating geological experiences in Queensland, was read to members. Mr. T. Sault stated that plans for the exhibit at the Nature Show were well in hand and asked for members to assist with more specimens. An excursion was arranged for July 5 to the limestone quarry at Lilydale.

The subject for the evening was "Origin of Minerals" by Mr. A. Cobbett. The speaker first mentioned the chemical elements most prominent in minerals, with the Silicate group the most plentiful. The earth has a nickel core, partly molten, and partly solid, surrounded by a mantle and a crust. When dealing with a magma, its melting and cooling points had to be considered to reach the eutectic point for solidification. This work, however, was extremely intricate, owing to the large number of substances in a rock. There was always a systematic "throw-out" of basic material first, then intermediate felspars, followed by acid types. Even this order can be disturbed while cooling. Chemical mineralizers can also be at work, such as heated water and various vapours. These generally form dykes through the country rock. Fumeroles can deposit boron and sulphur with other kindred minerals. Replacement and stress can also operate to alter many minerals. These mostly have long narrow crystals. The origin of secondary minerals was dealt with at length, using specimens to explain the processes. Minerals of an organic origin were the calcite group, arragonite, and many in the silica group, etc. To finalize, the speaker used a large collection of minerals to explain the basic facts, thus making an intricate subject much easier.

Exhibits: Large collection of minerals including tourmaline in quartz, garnet, lepidolite, crocidolite, asbestos, hornblende, woolastonite, kyanite, staurolite, rubellite, amethyst, monazite, copper carbonates, pyrite, malachite, beryl, corundum (Mr. A. Cobbett); large felspar crystals from Yackandandah (Mrs. Salau); agates cut and polished from Agate Creek, north Queensland (Mr. R. Davidson); vesicular basalt and baked clays from excavation at Spencer Street railway station (Mr. N. Wigmore); schists, gneiss, garnets in altered rock from Wilkes Base, Antarctica (Miss Griffin); rock sections under microscope (Mr. D. McInnes); packages of molybdenum and fossil wood for distribution to members (Mr. D. Dangerfield).

Botany Group—June 11, 1964

The main item of the evening, *Chenopodiaceae*, a lecture by Miss L. White on the goose-foot or saltbush family, was full of interest and most informative. World-wide distribution, habitat, flower-form and systematics were dealt with in detail.

This being the annual meeting, the following were elected office-bearers for the ensuing year:

Chairman—Mr. B. Fuhrer.
Secretary—Mr. F. Zirkler.
Programme Steward—Miss M. Allender.
Property Stewards—Miss M. Bland, Mr. E. Dawes.

The remainder of the agenda was concerned with reports, the Nature Show, excursions, and the slide library.

AFFILIATED CLUBS

Warrnambool Field Naturalists Club

Warrnambool annual report discloses a year of activity and interest, with the regular round of excursions and lectures, mostly by members.

One highlight was the visit of the F.N.C.V. over Easter. Another is a new nesting record for Victoria—the Black-cheeked Cormorant.

Besides its self-imposed task of reforesting Tower Hill, the Club is adding its voice to those demanding protection of the lower Glenelg, preferably by a substantial National Park.

Mr. W. Mathieson is President, and the former President, Mr. John Edge, is Secretary-Treasurer.

Ballarat Field Naturalists Club

This Club reports regular meetings and excursions, some of the latter in conjunction with the Geelong and Maryborough Clubs. Ballarat has also linked up with the Western District Association of Field Naturalists Clubs, hoping thereby to be able to help control the rage for pine plantations.

Mr. P. Day is President, and Mrs. E. G. Bedggood, Honorary Secretary.

Benalla Field Naturalists Club

This Club reports good progress. In addition to the usual general meetings, the well-known English microscopist, Mr. H. A. Dade, has been having microscopical evenings in his home.

A most interesting development is the holding of combined excursions with the Ringwood F.N.C. Fauna members of both these clubs have been active observing animals in the Strathbogie Ranges. The club has also had Mrs. Gladstone, of Beechworth, as a leader on an excursion to Mount Pilot.

Mr. W. McCall Say is President, and Mr. E. Harrison is Secretary.

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2/6

Magnificent stand of White Mountain Ash, *Eucalyptus regnans*, in the Marysville State Forest

FORESTS COMMISSION VICTORIA

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Vol. 81, No. 5

F.N.C.V.

September 10, 1964

The Victorian Naturalist

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CONTENTS

Front Cover:

This photograph of a Wedgetailed Eagle, *Aquila audax*, taken by Charles Barrett is reproduced from the June 1928 issue of the *Vict. Nat.* (45: 49).

The Eastern Australian Orchid, *Diuris punctata*

(A Critical revision of the complex originally figured and named *Diuris punctata* by James E. Smith in 1804)

By A. W. Dockrill

Summary of Nomenclatural Changes in this Paper:

Diuris alba R. Br. is reduced to varietal rank under *D. punctata*.

D. punctata var. *longissima* Benth. is upheld, and *D. cuneata* FitzG. is reduced to synonymy thereunder.

D. punctata var. *punctata* forma *blakneyae* F. M. Bailey is amended to allow of a much wider interpretation.

D. punctata var. *sulfurea* Rupp is reduced to a colour form of *D. punctata* var. *punctata*.

D. punctata varieties *albo-violacea* and *parvipetala* are described as new.

The need for a revision of this puzzling, polymorphic species has been felt by most students of Australian orchids. In fact, the late Rev. H. M. R. Rupp, in the light of the information he then possessed, did attempt the task [*Vict. Nat.* 63: 178 (Dec. 1946)] and several years before his death he was working towards a further paper on the subject. The present author is deeply indebted to Mr. J. H. Willis (Melbourne Herbarium) who, by research, review and suggestion, has contributed much to this paper—an attempt at the re-definition of the species, as occurring over the whole of its range. Because of the very wide distribution, some entities may even yet await discovery; moreover, the very nature of the species will probably always militate against a completely satisfactory classification. The case of *D. punctata* emphasizes how inadequate is a rigid framework of nomenclature for expressing the innumerable variations that can occur within a single species. Genetical research in the group is a desideratum.

In this paper the use of certain terms calls for the following explanation:

(a) Labellum will consist of a central basal disk, two lateral lobes and an apical, expanded mid-lobe.

(b) To avoid confusion with the taxonomic rank of "form" (*forma*), the various floral shapes in specimens will be referred to as "figures" not "forms".

(c) An indistinctly clawed petal will be one in which the petal is not sharply differentiated into claw and lamina, since the claw gradually dilates toward the lamina and the latter imperceptibly narrows toward the claw.

(d) When the colour of a flower is mentioned, it will exclude the colour of the lateral sepals (which are in shades of green, brown or dark purple), also the small amount of yellow at the base of the column and on the disk of the labellum.

When measurements of segments are given, they are intended merely as a guide to the usual flowers of a taxon and not as an inflexible rule, since most of the taxa are extremely variable in almost every segment. Very general terms such as long, short, medium, etc., are often the only ones (no matter how unsatisfactory) with any practical application. It cannot be too strongly stressed that, in attempting the identification of the taxa (even when using the *Key* at the end of this paper), reliance should not be placed on one or two characters, but upon the assemblage of charaters. Location, although not a determining factor, is nevertheless a frequent and useful guide.

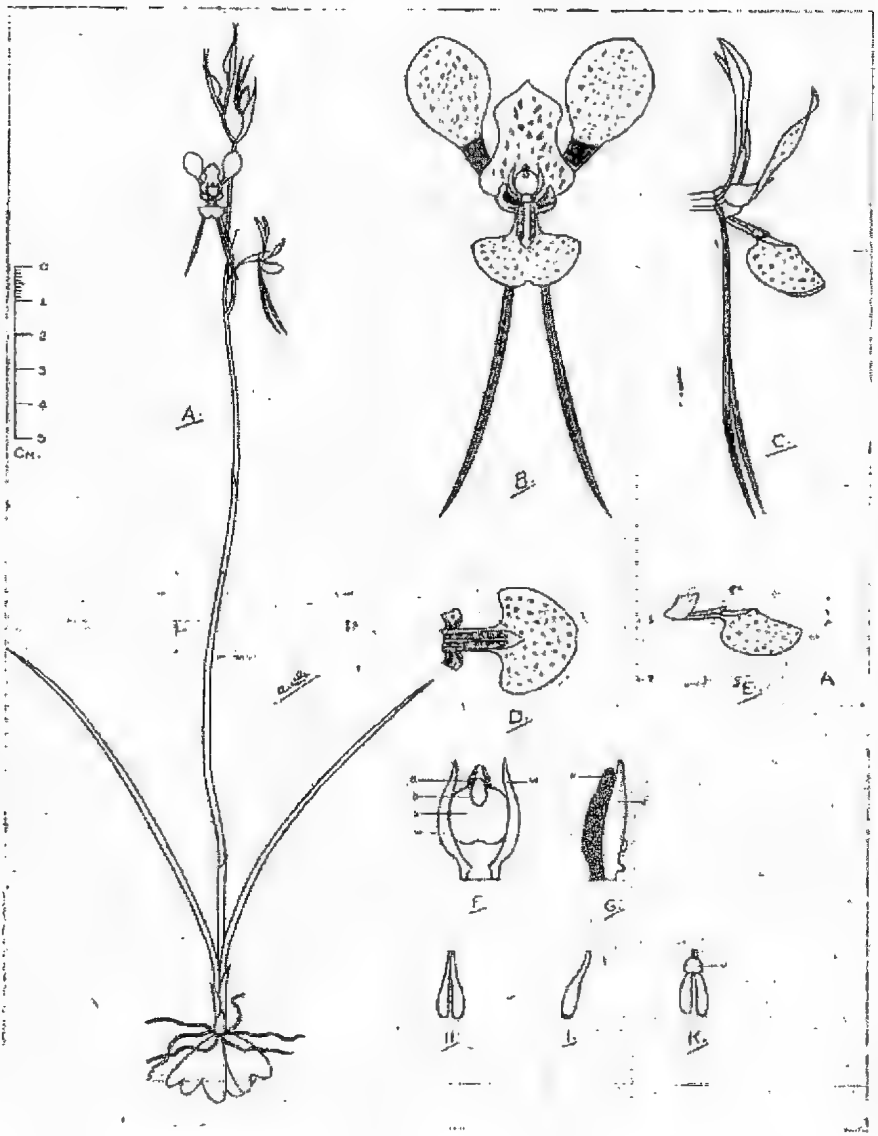

PLATE 1

A—Complete plant of *Diuris punctata* Sm. var. *punctata* forma *punctata* (from Campbelltown, N.S.W.);

B—Flower from front; C—Flower from side; D—Labellum from above;

E—Labellum from side; F—Column from front; G—Column from side;

H—Pollinia from front; I—Pollinia from side; K—Pollinia from front (when flower open to show viscidium attached);
a—Anther; b—Bursicle; s—Stigma; w—Column wings; v—Viscidium.

Two pages of the accompanying illustrations show the flowers in a flattened, unnatural aspect, so that the basic shape of each segment can be seen. In the natural position, the keeling of the mid-lobe of the labellum (in some specimens), rolling of the margins of the dorsal sepal or even petals, angle which the labellum forms with the dorsal sepal, and column-embracing habit of the lateral lobes of the labellum in some specimens, all tend to give a false impression of the actual outlines of various segments.

DIURIS PUNCTATA Sm. *Exot. Bot.* 1: 13, t. 8 (1804);

Benth. *Flor. Aust.* 6: 326 (1873); R. D. FitzG. (incl. 37 b); F. M. Bailey *Qd. Flor.* 5: 1564 (1902); R. S. Rogers in Black *Flor. S. Aust.* 1: 142 (1922); E. E. Pescott *Orchid. Vict.* 68 (1928); H. M. R. Rupp *Orchid. N.S.W.* 12 (1943) etiam *Vict. Nat.* 63: 178 (Dec. 1946).

An aggregate and exceedingly complex species of striking polymorphy, embracing at least six major variations (distinguishable as varieties) and three minor (distinguishable as forms). Its flowers range in size from one of the largest in the genus *Diuris*—being rivalled only by some of the giant figures of *D. longifolia* R. Br. and *D. sulphurea* R. Br.—to one of the smallest. Thus, the combined length of dorsal sepal plus labellum ranges from almost 5·0 cm. down to 1·25 cm. The diversity in colour is quite as striking as the range in segment-shape and size. Usually the flowers are not fragrant, but in some districts they are pleasantly scented.

Each variety, herein listed, is widely distributed (with the exception of var. *albo-violacea*) and possesses a distinctive combination of characters. But, owing to the polymorphy, colour variation and range in size of some varieties (very noticeable in certain areas, while in other districts their features remain comparatively stable), it is difficult to classify satisfactorily separated or selected extremes of variation.

Another rather puzzling situation is the development of small, isolated, aberrant populations (? mutants) which do not warrant any taxonomic rank. For example, a suite of specimens collected near Pittown on the Hawkesbury River, N.S.W., by Dr. W. Woolls in the 1880's, has not been duplicated anywhere since then; this collection is incorrectly labelled "var. *minor*" in the National Herbarium at Sydney. Likewise, C. Walter, in *Vict. Nat.* **23**: 240 (Mar. 1907), thus described *D. punctata* var. *d'altonii* from material collected at Mt. Arapiles near Natimuk, Victoria:

". . . differs from the typical form of *Diuris punctata* Smith in having

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Plate 2

1–3—*D. punctata* Sm. var. *punctata* forma *blakneyæ* F. M. Bailey (Near Campbelltown, N.S.W.).
9—*Ditto* (Stanthorpe, S.E. Q'land). 10—*Ditto* (Benalla, Vic.) 11—*Ditto* (Kurri Kurri, N.S.W.).
12–15—*D. punctata* var. *punctata* forma *punctata* (Near Campbelltown, N.S.W.).
16—*D. punctata* var. *punctata* forma *blakneyæ* (Casino, N.S.W.).
17—*Ditto* (Braidwood, N.S.W.).
18—*D. punctata* var. *alba* (R. Br.) Dockrill (South Molle Id., Q'land).
19—*D. punctata* var. *minor* Benth. (Wallangarra, S.E. Q'land).
20–22—*D. punctata* var. *punctata* forma *sulphurea* (Rupp) Dockrill (Green Valley, Guyra, N.S.W.).
23—*D. punctata* var. *punctata* forma *blakneyæ* (Taree, N.S.W.).
24—*Ditto* (Mt. Fox, N. Q'land).
25–26—*D. punctata* var. *alba* (Wamberal, N.S.W.).
27—*D. punctata* var. *minor* (Clifton, New England, N.S.W.—from Type specimen).
28—*Ditto* (Uralla, N.S.W.).
29—*D. punctata*, aberrant form (Pittown, N.S.W.).
30—*D. punctata* var. *alba* (Rockhampton, Q'land). 31—*Ditto* (labellum of No. 30).
32—*Ditto* (Shoal Passage, N. Q'land—from Brown's Type specimen).
33–34—*Ditto* (Wamberal, N.S.W.). 35–38—*Ditto* (Maryborough, Q'land).

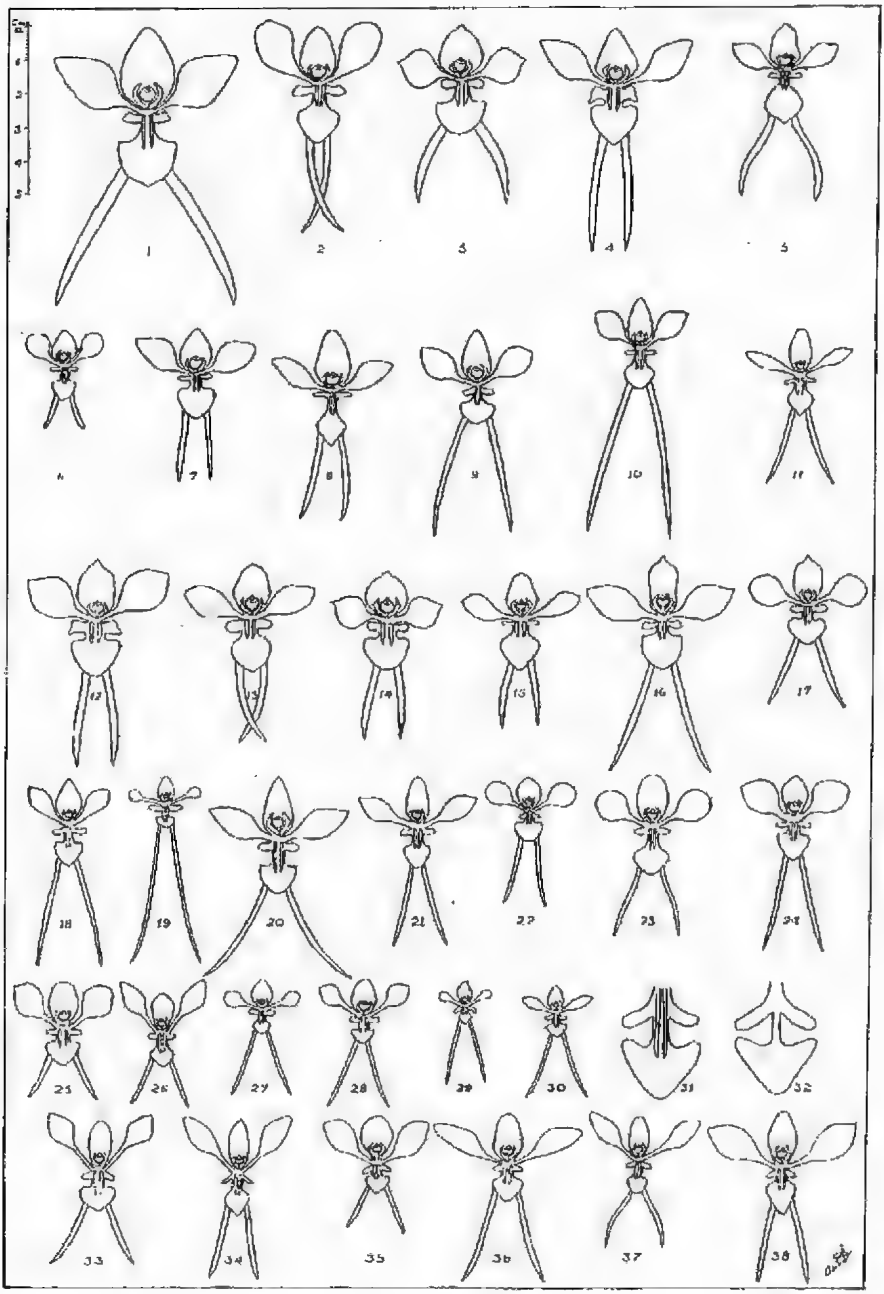

PLATE 2

shorter petals (only ½ inch in length), while the lower lobes of the calyx are thread-like and much longer (fully two inches in length) and of a pale green colour."

Walter's type specimen has completely disappeared, so that its identity is now guesswork. Many people have later searched in the locality given, without seeing anything remotely resembling a *Diuris punctata*. This variety is better excluded from any evaluation of the present species as such.

The distribution of *D. punctata* is from the coast to the western plains of eastern Australia, from the Atherton Tableland in north Queensland, through central and southern Queensland, New South Wales and Victoria to Mt. Gambier district in SE. South Australia. It is essentially a plant of the natural fields, parklands and open grassy country generally, and has been exterminated by grazing over much of its former territory, e.g. in Victoria.

For those students unfamiliar with *Diuris punctata*, the following detailed diagnosis is provided:

Plant terrestrial. *Tubers* ovoid or sometimes palmate. Roots few. *Leaves* 1-4, measuring 10-40 × 0·2-1·0 cm., linear, channelled, grass-like. *Flowers* 2-10, measuring 2-6 cm. across expanded petals, usually (except for the lateral sepals) some shade of lilac or purple but sometimes white or reddish-mauve, very rarely pale cream, yellow or pale lilac with much darker spotting [often the labellum is a darker shade than the dorsal sepal and petals, but sometimes it is paler].

Dorsal sepal 8-25 × 5-15 mm., usually ovate but sometimes almost orbicular, occasionally constricted about the middle and sometimes apiculate, usually cucullate over the column at the base, thereafter recurved into an almost upright position but occasionally not recurved. *Lateral sepals* 25-90 × 1-4 mm., green, brownish or dark purple, linear, acute, deflexed, pendulous, sometimes crossed, usually at least twice as long as petals. *Petals* 8-30 × 3-14 mm., distinctly or indistinctly clawed, the lamina ovate, orbicular, cuneate or spathulate. *Labellum* 7-22 × 4-17 mm., trilobate; disk narrow, the two ridges sometimes yellow, often ending (anteriorly) in tooth-like processes; lateral lobes from base of disk very variable in size, usually oblong-falcate (but shape also variable), the apical margin sometimes crenulate; mid-lobe expanded into a lamina from the apex of the disk, usually twice as long as lateral lobes, ovate, orbicular, scutiform, flabelliform or even trapeziform, occasionally apiculate or emarginate, usually keeled.

Column short and broad; wings arising from the base, erect, extending usually as high as the anther, narrow, falcate or lanceolate, often crenulate and yellow in front. *Stigma* large, suborbicular. *Rostellum* covered by an ovoid bursicle at apex of the stigma. *Anther* usually brown, rugose, firmly attached at the posterior of the column and extending just higher than the bursicle; pollinia 2, each deeply cleft, mealy, slender, hanging from the rostellum without stipe or caudicles; viscidium ovoid, not becoming attached to the pollinia until flower has been open some time and is reaching "maturity".

Arrangement of the Infra-specific Categories

1. DIURIS PUNCTATA Sm. var. PUNCTATA

The most complex taxon within the species, with at least three colour forms, one of which is extremely variable.

Plate 7

39–45—*D. punctata* var. *longissima* Benth. (Dripstone, N.S.W.).
46–49—*D. punctata* var. *albaviolacea* Rupp ex Duckrill (Sunshine, Vic.).
50–52—*Ditto* (Sydenham, Vic.—TYPE loc.).
53–56—*D. punctata* var. *parvipetala* Duckrill (Proston district, Q'land).
57–59—*D. punctata* var. *punctata* forma *blakneyi* (from Bailey's illustration of his TYPE form).
60—*Ditto* (from Bailey's illustration stated to portray the usual form of the species).
61—*Ditto* (Ravenshoe, N. Q'land—from Bailey's TYPE specimen).

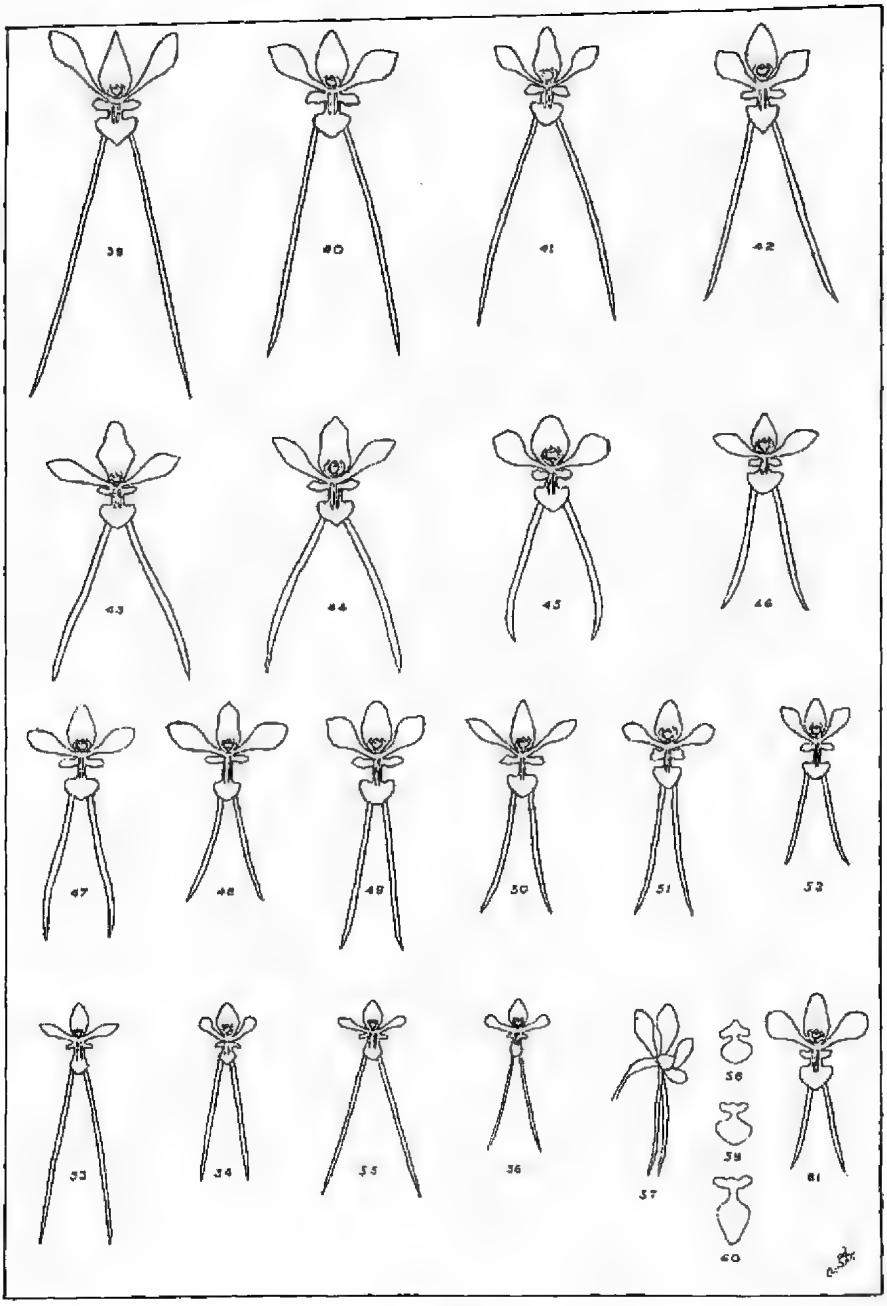

PLATE 3

(a) Forma *PUNCTATA*

A form of quite variable structure, its flowers of moderate to very large size, pale mauve in colour, with much darker distinct spotting on all segments other than the lateral sepals.

When J. E. Smith published his plate (t. 8 in *Exotic Botany*, 1804), he gave no locality record more explicit than "New Holland"; but it is known that numbers of the other plants described by him came from the Liverpool-Camden area, N.S.W. No further specimens of this form were recorded until P. A. Gilbert located it again near Campbelltown, N.S.W.—more than 130 years later in September 1934. The present author was shown this location (by Mr. Gilbert), where colonies of the spotted type form occurred spasmodically throughout a large scattering of *D. punctata* var. *punctata* forma *blakneyæ* (q.v.). Their flowers were quite variable and, except for colour, indistinguishable from some figures of the latter. There are reports that forma *punctata* also occurs in a few districts other than Campbelltown, but the writer has not been able to see specimens from these places.

In view of the history and distinctive colour pattern of this form, it is considered advisable to distinguish it nomenclaturally.

ICONOTYPE: Searches in the herbaria at Kew and British Museum (Nat. Hist.) have failed to reveal the specimen delineated by Smith, so presumably it has been lost. Smith's illustration (*l.c.*) must therefore serve as an ICONOTYPE.

NEOTYPE: Near Campbelltown, N.S.W. (*A. W. Dockrill*, 26/9/1948—Herb. NSW, n. 57121).

DISTRIBUTION: Only Campbelltown district, N.S.W., as far as definitely known, but pale-spotted specimens of the vars. *longissima* Benth., *alba* (R. Br.) Dockrill and *parvipetala* Dockrill have been seen from several widely separated localities; so perhaps forma *punctata* also awaits discovery in areas far removed from Campbelltown.

(b) Forma *BLAKNEYÆ* F. M. Bailey *Compr. Cat. Qd. Plants* 847, fig. 973 A, B & E (1913).

D. elongata Swartz in Schrad. *Neues J. Bot.* 1[1]. 59 (1805); R. Br. *Prodr. Flor. Nov. Holl.* 316 (1810); Lindl. *Gen. & Spec. orchid. Plants* 509 (1840); Reichenbach f. *Beitr. syst. Pflk.* 13 (1871); R. D. FitzG. *Aust. Orchid.* 1[1] (1878).

D. lilacina F. Muell. in *Linnaea* 26: 239 (1853).

Bailey distinguished his form by a broad mid-lobe of the labellum [Figs. 57, 58 & 59 are taken from his illustrations] and also figured (*l.c.*) a labellum of what he considered to be the usual form of the species [Fig. 60 is taken from this]. The present author has examined Bailey's holotype specimen of forma *blakneyæ* [Fig. 61 was prepared from it], and is firmly convinced that there is nothing unusual or outstanding about it; his collection merely represents one figure of a variable form—specimens duplicating Figs. 57, 58, 59, 60 & 61, and a range of intermediates, can be found in the field alongside one another and they are obviously all referable to a single taxon. The writer sees no reason why *one* figure should be singled out, from others which are just as distinctive, for special treatment. Since the "forma *blakneyæ*" must stand [see *Internat. Code Bot. Nomencl.* Art. 16, 61 & 70 (1952)], it is now proposed that the circumscription of the form be broadened to include the multiplicity of figures discussed hereunder.

In its amended interpretation, this becomes the "typical" or most usual form of the species (but, of course, not the type form) and most of the citations given for the species probably apply to this form only. Its flowers are morphologically identical with those of forma *punctata*, but the colour is exceedingly variable: pale mauve to deep reddish-purple, occas-

ionally white, and rarely pale cream [*cf.* W. H. Nicholls in *Vict. Nat.* **46**: 182 (1930)]; specimens often have various segments of different colours, and occasionally the labellum is spotted, but never *all* segments as in the forma *punctata*. Its range of structure and size are little short of astonishing, and it is possible to find a scattering of plants in a small area where the following variations occur:

flowers small to very large (combined length of dorsal sepal plus labellum 2-5 cm.); *lateral sepals* 2-4 times length of petals, usually lax but sometimes recurved or even crossed; *petals* usually distinctly clawed but occasionally obscurely so, the lamina moderate to large in size and ranging from suborbicular to sublanceolate, occasionally apiculate; *lateral lobes of labellum* usually ⅓ to ¾ the length of mid-lobe, about twice as long as broad and oblong-falcate, but sometimes they are either smaller or larger, varying from suborbicular and clawed to obovate-subtriangular or even linear; *callous plates* (or ridges) of disk occasionally glandular; *mid-lobe of labellum* sometimes acutely keeled and sometimes flat, suborbicular, flabelliform, ovate, subtriangular or even trapeziform, and sometimes apiculate or emarginate; *column-wings* from 1·5 mm. lower than apex of anther to 1·5 mm. above it, and apical half of outer margin ranging from entire to crenulate or even serrate.

HOLOTYPE: Ravenshoe, N. Q'land (Miss *F. A. Blakney*, 2/11/1912—Herb. BRI).

DISTRIBUTION: From the coast to the Western Plains of eastern Australia, from the Atherton Tableland in north Queensland through Queensland, New South Wales and Victoria to Mount Gambier in South Australia. Sometimes on grassland that is swampy during winter (e.g. Bairnsdale district, Vic.).

(c) Forma *SULFUREA* (H. M. R. Rupp) A. W. Dockrill, *stat. nov.*

D. punctata var. *sulfurea* H. M. R. Rupp in *Proc. Linn. Soc. N.S.W.* **69**: 73 (1944).

A careful examination of all specimens of this form in the National Herbarium of New South Wales has shown that their morphology is quite identical with that of forma *punctata*, the sole difference being that of colour. It is apparently well-established in its only known district, and the clear sulphur-yellow colour is so outstandingly distinct from the usual mauve, purple or white in flowers of this species that recognition of a colour form (but not a variety) is warranted.

None of the specimens at Sydney Herbarium bears a label (in Rupp's, or any other, handwriting) to indicate that a type is concerned; so the present author has chosen one of them as lectotype.

LECTOTYPE: Green Valley, Guyra, N.S.W. (*F. P. Skinner*, Oct. 1936—Herb. NSW, n. 57122).

DISTRIBUTION: New South Wales only, where confined to the type locality.

2. D. PUNCTATA Sm. var. ALBA (R. Br.) A. W. Dockrill, *comb. nov. & stat. nov.*

D. alba R. Br. *Prodr. Flor. Nov. Holl.* 326 (1810); Benth. *Flor. Aust.* **6**: 325 (1873); F. M. Bailey *Qd. Flor.* **5**: 1564 (1902). [Rupp, *Orchid. N.S.W.* 12 (1943), doubtfully refers to this variety.]

Sir George Taylor (now Director, Royal Botanic Gardens at Kew) has kindly supplied a scale sketch of the labellum from a softened-out flower of R. Brown's holotype specimen [Fig. 32 is taken from this sketch] and has supplied the following information: Collected at Shoal Passage, Queensland, 26th August 1802, and housed at the British Museum (Nat. Hist.) under No. 5558; over-all length of labellum 7 mm.; lateral sepals 23-35 mm. long; petals not very acute.

A careful examination of a number

of specimens belonging to this taxon has shown that the margins of the disk of the labellum will fold over or tightly inroll on drying, giving the disk a very narrow appearance. Anyone not familiar with this habit would find it difficult to see the margins of the disk or the callous plates (longitudinal ridges). Therefore we can, with reasonable safety, assume that the disk in Brown's specimen was actually broader than that depicted by Sir George Taylor, and that in the fresh state it would most probably accord with Figs. 30 & 31.

Dr. W. T. Stearn, in *Endeavour* 19 (n. 73): 33 (Jan. 1960), reproduced a beautiful drawing of *D. alba* R. Br. by Ferdinand Bauer, 1802-05. Since Brown's specimen was collected in 1802, we may also reasonably assume that Bauer's meticulous illustration portrays either the type specimen or at least one of the selfsame taxon. It shows a labellum disk that is not very narrow.

This taxon has the following distinguishing features: flowers small to medium in size (combined length of dorsal sepal plus labellum 1·5-3·0 cm), white or white with purple suffusions or spots; lateral sepals usually rather short, often less than twice the length of the petals; petals plus mid-lobe of labellum very variable; lateral lobes of labellum slender; ridges of disk 2, not 3 as stated by some authors [Bauer's illustration (*l.c.*), on first appearances, seems to have a central ridge; however, examination of specimens shows this to be an area of colour and not a ridge]; column details are quite consistent with *D. punctata*. Bailey (*l.c.*) stated that it is difficult to separate *D. alba* from *D. punctata* in the dried state, and so it is; in fact, the former taxon is little more than a geographically distinct colour form. It is now proposed to reduce *D. alba* R. Br. to a variety of *D. punctata* Sm.

HOLOTYPE: Shoal Passage, N. Queensland (*R. Brown*, 26/8/1802—Herb. BM).

DISTRIBUTION: Near-coastal districts from Rockingham Bay, North Queensland, to Port Jackson in central New South Wales, showing a preference for "Wallum" and open heaths.

3. D. PUNCTATA Sm. var. MINOR Benth. *Flor. Aust.* 6: 327 (1873).

In British herbaria there are no specimens bearing the varietal epithet "*minor*" in Bentham's handwriting; but the specimens collected in the New England and Upper Clarence River districts of New South Wales, and referred to by him (*l.c.*), are in the National Herbarium of Victoria. The labels on these specimens give no indication of type material, so the present author has chosen one of them as lectotype, viz. from Clifton in New England (about 19 miles west of Tenterfield, N.S.W.); Fig. 27 was taken from a softened-out flower of this specimen.

Flowers in this variety are small (usual length of dorsal sepal plus labellum little more than 1·5 cm.); colour is usually deep bluish-mauve to purple, but occasional pale mauve or even white flowers are seen; lateral sepals vary in length from moderate to very long (about 2-5 times the length of petals); petals rather small, usually with long, distinct claws and suborbicular laminae; labellum with rather large lateral lobes which are at right angles to the disk, and mid-lobe more or less flabelliform.

G. Bentham's description, ". . . mid-lobe of labellum more rhomboidal", is puzzling because none of the specimens quoted by him show this feature. Possibly his impression was gained from a dried-up and faultily pressed labellum from some flower.

LECTOTYPE and PARATYPES: Clifton, New England, N.S.W. (*C. Stuart*, about 1870—Herb. MEL).

DISTRIBUTION: Tablelands of the northern half of New South Wales and of southern Queensland.

4. D. PUNCTATA Sm. var. LONGISSIMA Benth. *Flor. Aust.* 6: 327 (1873).
D. cuneata R. D. FitzG. *Aust. Orchid.* 2²: 1891); H. M. R. Rupp *Orchid. N.S.W.* 12 (1943).

J. H. Willis has carefully examined an isotype specimen of this variety (from Mudgee, N.S.W.) and is quite satisfied that it is identical with *D. cuneata* R. D. FitzG.; so also was Rev. Rupp, when shown the same specimen in May 1953. The cuneate petals, undulate margins of the mid-lobe of the labellum and glandulation of the callous plates of the disk, features stressed by FitzGerald, have been found to be much more variable in this taxon than was known to him. Undoubtedly Bentham was justified in classifying it as merely a variant of *D. punctata*.

The usual form of this variety is characterized as follows: moderate to large flowers (length of dorsal sepal plus labellum 2·25-3·5 cm.) which have a relatively large dorsal sepal; long lateral sepals (even up to 9 cm. or more); more or less indistinctly clawed petals; labellum with broad lateral lobes (their breadth up to half the length of mid-lobe) which embrace the column, and mid-lobe somewhat flabelliform. However, Figs. 39-45 indicate some of the variations within this variety. Its colour range is most pronounced—from white with purple suffusions to deep reddish-purple, some specimens being even spotted and reminiscent of the forma *punctata* [see also FitzGerald (*l.c.*)], some striped or dark-coloured with the margins of segments outlined in white.

ISOTYPE: Mudgee, N.S.W. (*Taylor*, 1870 Herb. MEL).
DISTRIBUTION: Northern Victoria (where now reduced to rarity through the inroads of grazing, etc.), southern New South Wales from coast to Western Plains and on the Central Western Slopes

5. D. PUNCTATA Sm. var. ALBO-VIOLACEA H. M. R. Rupp ex A. W. Dockrill, *var. nov.*
D. alba sens. auctt. Vict., *non* R. Br.

Flores modici suaveolentes, albi et violaceo-suffusi; sepala lateralia longissima; petala magna, saepe indistincte ungulata; labellum lobis lateralibus magnis atque lobo medio plerumque flabelliformi, eius disco angusto longissimoque (lobum medium subaequanti).

HOLOTYPE: Sydenham, Victoria (*P.R.H. St. John*, Oct. 1912—Herb. MEL)
PARATYPES: *Loc. cit.* (*W. R. Baker*, 6/11/1901—Herb. MEL)
DISTRIBUTION: Southern Victoria, where restricted to the Keilor and Werribee basaltic plains (on dry grassland) and now extremely rare.

Flowers of moderate size (combined length of dorsal sepal plus labellum usually a little less than 3 cm.), fragrant, white with violet suffusions; lateral sepals long (3-4 times the length of petals); petals usually indistinctly clawed; lateral lobes of labellum very large (often as long as the mid-lobe); disk very long (about the length of mid-lobe) and narrow; mid-lobe usually flabelliform.

The variety *albo-violacea* has affinities with var. *longissima*, from which it differs chiefly in the very long and narrow disk—see Key and Figs. 46-52.

The varietal epithet, referring to the colour of the flower, was suggested by Rev. H. M. R. Rupp several years before his death. It would have been published in his revision of the *D. punctata* complex (never completed).

6. D. PUNCTATA Sm. var. PARVIPETALA A. W. Dockrill, *var. nov.*

Flores parvuli (sepalum dorsale una cum labella 1·75 cm. solum

metiens), luteo-albi, punctis maculisque violaceis obliti; angulus inter labellum et sepalum dorsale acutissimus; sepala lateralia longissima (quam petala sextuplo longiora); laminae petalorum variabiles sed semper parvulae, breviter sed late unguiculatae (totum petalum brevissimum, truncatum, cuneatum); labellum lobis lateralibus minimis atque lobo medio parvulo, ustitate subrhomboidali, eius disco plerumque carinato (lobus medius a disco non clare discriminatur)

HOLOTYPE: Brigooda, Queensland (*W. Power*, Sept. 1954—Herb. BRI).

DISTRIBUTION: Queensland, where only occasional from the Atherton Tableland to the border of New South Wales, but occurring in fair numbers in the Proston area. It seems to favour higher elevations or areas not close to the coast.

Flowers very small (combined length of dorsal sepal plus labellum usually about 1·75 cm.), except for the lateral sepals coloured cream with mauve spots and blotches; dorsal sepal forming a very acute angle with the labellum; lateral sepals extraordinarily long, averaging about 6 times the length of petals; laminae of petals variable in shape but extremely small, the claw short and broad so that the whole petal often appears truncate or cuneate; lateral lobes of labellum very small; mid-lobe small, usually subrhomboidal and with no sharp line of demarcation from the disk which is usually keeled.

The variety *parvipetala* has often been mis-identified either as var. *alba* or var. *minor*, but its morphology is quite distinct—*cf.* Key and Figs. 53-56.

KEY TO VARIETIES AND FORMS OF *D. punctata*

1. Lateral lobes of labellum at least ½ as long as mid-lobe, or, if slightly less, then very broad.
   (a) Flowers usually dark purple (but variable); length of dorsal sepal plus labellum seldom above 1·6 cm; lateral sepals 2-5 times length of petals; petals distinctly clawed . . . . . var. *MINOR*
   (b) Flowers variable in colour; length of dorsal sepal plus labellum 2·2-3·5 cm.; lateral sepals 3-4 times length of petals; petals indistinctly clawed; lateral lobes of labellum very broad; disk not long and slender . . . . . var. *LONGISSIMA*
   (c) Flowers white with violet suffusions, fragrant; length of dorsal sepal plus labellum usually slightly less than 3 cm.; lateral sepals 3-4 times length of petals; petals indistinctly clawed; lateral lobes of labellum often as long as mid-lobe; disk long (often as long as mid-lobe), very narrow . . . . . var. *ALBO-VIOLACEA*
2. Lateral lobes of labellum less than ½ as long as mid-lobe, or, if approaching half, then very narrow.
   (d) Flowers cream with purple spots and suffusions, length of dorsal sepal plus labellum usually about 1·7 cm.; lateral sepals averaging 6 times length of petals; petals with very small laminae; mid-lobe of labellum indistinctly separated from disk . . . . . var. *PARVIPETALA*
   (e) Flowers white or white with purple suffusions; length of dorsal sepal plus labellum 1·5-3·0 cm.; lateral sepals 1½-2½ times length of petals; laminae of petals moderate in size . . . . . var. *ALBA*
3. All segments extremely variable, but combinations of characters not as in other five varieties . . . . . var. *PUNCTATA*
   (f) Flowers pale mauve with much darker spotting on all segments . . . . . forma *punctata*
   (g) Flowers sulphur-yellow . . . . . forma *sulfurea*
   (h) Flowers variable in colour (white to deep purple), without spots or rarely so on labellum only . . . . . forma *blakneyae*

Australian Wattles—No. 42

Mealy Wattle, *Acacia farinosa* Lindl., and Hard-leaf Wattle, *A. sclerophylla,* Lindl.

By Jean Galbraith

Mealy Wattle is named for its mealy (farinaceous) buds, flower-stalks and young leaves. It is a distinctive but rather undistinguished dull green, shrubby wattle of the dry country, stiff in some localities and somewhat weeping in others.

The stiff, usually curved, leaves are shallaleigh-shaped, i.e. broad and blunt at the top and narrowed to the base, dull green, impressed with a fine mesh of longitudinal veins, and 1″ to 2″ long, with the broadest part ⅛″ to occasionally as much as ¼″ wide. There is sometimes a small thick point on the tip, sometimes a small notch.

The relatively small, short-stalked flower-heads arise singly, in pairs or in threes, from the leaf-bases and are a rather light yellow. Both flowers and leaves are commonly well-spaced, and the pods are about the same width as the leaves, often curved, dark with lighter margins, 1″ to 2″ long and narrowed to both ends as well as slightly narrowed between the broadly oval seeds. They are inconspicuous amongst the leaves.

A Western Wimmera variety, var. *glabra*, has larger, brighter flowers and typical leaves, but less mealy stems.

Mealy Wattle extends from northern Victoria to Western Australia.

A rather similar north-western species is Hard-leaf Wattle (*A. sclerophylla*) but its phyllodes are less blunt and occasionally more-or-less sigmoid

Mealy Wattle—*A. farinosa* Photo: *N. A. Wakefield*

(like the old fashioned long ſ) with the fine veins less apt to run into each other. The two species cannot be confused because Hard-leaf Wattle is not at all mealy, and there is always only one of its little dark yellow flower-heads at the base of each phyllode. The heads are short-stalked and the stalks quite glabrous.

The pods of both species are about the same size, but those of Hard-leaf Wattle are usually straight, and are veined like the foliage, though less distinctly.

The Naturalist and the Microscope

Cleaning Diatomaceous Deposits

By H. Barrett

A fossil diatomaceous deposit was recently discovered in the Happy Jack mine near Ballarat, and a sample of it being given to the Microscopical Society it was passed on to me for cleaning and any particulars I could give concerning it.

There has not yet been sufficient time to clean it thoroughly, but it has reached the stage where the diatoms can be recognized and a list of these is given below.

The following is the method I use for cleaning this or any other fossil deposit. In fact, I gave it in an article in our *Proceedings* for February 1944 for cleaning the Oamaru fossil deposits, and it can be used, with slight variations, for any others.

1. Break into pieces about ⅜″ square, place in an evaporating dish till about half full, then fill up dish with crystals of acetate of soda or hypo (the latter answers perfectly) and boil over a spirit lamp for about 15 minutes, then allow it to cool and crystallize. Add water, then heat again. When dissolved pour the water with sediment into a container, such as a tall preserving jar, and allow the sediment containing the diatoms to settle for at least half an hour, then pour off the milky water. Repeat the crystallization till the earth is all broken up, adding the water with sediment to the first lot.
2. Keep washing the sediment in water, pouring off after half an hour, till the water remains clear.
3. Put the sediment containing the diatoms into the porcelain evaporating dish, and when settled carefully pour off the water, removing the last few drops with a pipette, then about half fill the dish with commercial strength hydrochloric acid* and boil for about ten minutes; this eliminates any iron or carbonate of lime.

* In this and subsequent steps requiring the use of strong acids the greatest care must be exercised. Such acids are highly corrosive and should they come into contact with hands or clothes must be washed off at once. After heating, they must be allowed to cool before pouring into water. Never pour water into strong acid.

4. Wash thoroughly as before to remove all traces of acid. This will take two days at least.
5. Put in dish again, allow to settle, and remove all water.
6. Pour in nitric acid till dish is about one-third full, and boil for about ten minutes. All the acid boiling must be done in the open air, as the fumes are very corrosive. Allow it to cool, then pour it into a jar about half full of water, then fill with water and allow it to settle for one hour. Wash repeatedly for two days. With some fossil deposits the boiling in nitric acid can be omitted, but I think it advisable to carry it out with this one.
7. Put in dish again, allow it to settle and remove all water.
8. Pour in sulphuric acid (about ten times the bulk of the sediment) and boil for about twenty minutes, then allow it to cool, then pour it slowly into a jar about half full of water, then fill the jar and allow it to settle as before for one hour. Wash repeatedly for two days.
9. Examine under the microscope, and if clean except for sand, place the cleaned deposit in a shallow concave vessel, and give it a very light rocking and rolling motion. The diatoms will then gradually rise in a cloud in the centre, and can be drawn off with a pipette, leaving the sand in the bottom.
10. If there is still flocculant matter present with the diatoms, place them in the dish again, fill with water about half full, and bring the water to boiling point, and drop in as much caustic soda as you can pile on a sixpence. Boil for one and a half minutes (no longer), then tip it into a jar of cold water and wash as before.

The diatoms should then be perfectly clean.

The undermentioned list shows all the species I have located so far in this deposit, and there are probably others I have not yet seen.

Surirella hastata A.S.
Pinnularia viridis Cleve
P. nobilis Eh.
Synedra ulna W.S.
S. ulna var. *longissima* W.S.
Synedra sp.
Stauroneis phoenicenteron E.H.
S. fulmen Brt.
Epithemia gibba Kg. Must.
Cymbella delecta A.S.
Cocconeis placentula E.H. Plentiful.
Fragillaria sp.
Gomphonema intricatum K.G.
Navicula sphaerophera K.G.
N. inflexa Ralfs.
Stauroneis frauenfeldiana Grunow

This method can also be used for the cleaning of some recent gatherings: the scrapings from the surface of mud and sand for instance. The material should be put through a strainer of about 80 meshes to the inch first, to remove bits of weed, fragments of shell and any other refuse. It can then be dealt with in the same way as fossil material.

Diatoms growing on weed, either freshwater or marine, are treated differently.

The weed is first placed in a bucket or other suitable container full of water. A handful of washing soda is then added to the water, and the weed is then stirred frequently for about two hours. The diatoms will by then all have dropped off, and the weed can be removed. Allow the diatoms time to settle (about one hour), then deal with the sediment in the same way as the fossil material.

NOTE.—A sample of the diatomaceous earth from the Happy Jack Mine will be posted to any member who wishes to try his skill at cleaning a fossil diatom deposit. Send 6d. stamp to cover postage to Mr. D. E. McInnes, 129 Waverley Road, East Malvern.

Bush Brushes

The fox's brush was the traditional trophy of the chase. The Field Naturalist usually returns from an excursion into the bush with a different sort of "tale". If you have one worth mounting and preserving send it to the Assistant Editor, "Victorian Naturalist", 102 Murray Road, East Preston, N.18, Victoria.

Bulbuls

After reading the note about bulbuls by R. D. Lee in the *Vict. Nat.* 80 (12): 369, Mrs. J. Campbell of Hastings has sent in the following observation.

In reply to Mr. Lee's note regarding Bulbuls, I may say that I saw a few of these birds about 1930 in the Botanic Gardens, Melbourne.

I wrote to the late Donald Macdonald about them at the time. I remember Mr. Macdonald was amused at my letter. I had evidently read something about bulbuls having been imported from India and asked him to describe them. I followed this up by asking for an identification of the strange birds I had seen in the Gardens, and of course, these were bulbuls!

As far as I remember, there were only two or three of the birds; and as I have never heard of any being seen since, it is to be hoped they died out.

[It is interesting to note that Leach in his *Australian Bird Book* Ed. 9, states that the Red-whiskered Bulbul (*Otocompsa emeria*) is "a serious pest; should be eradicated now". In addition, these birds, which were introduced from Mauritius, were apparently common around Melbourne, as this is one of the book's noted localities. What has caused their decline —disease or inability to adapt themselves to a new environment?—R.H.J.McQ.]

Fungi Notes

These notes come to us from Mrs. Ellen Lyndon of Leongatha.

Now that the fungi season is with us again, there are exciting finds to be made in every garden and paddock or patch of scrubland.

Towards the end of May, I was invited to go fungi fossicking on a sandy, scrub-covered hill adjacent to the little township of Kongwak, which lies inland approximately halfway between Inverloch and Wonthaggi. Here we found several small specimens of *Hygrophorus lewellinae* growing in the powdery remnants of a rotting log. For years this toadstool has been considered very rare, but now that we are familiar with it, it is turning up between May and August each year throughout the sandy coastal plain from Stony Creek to Corinella, and from Kongwak to Tarwin. The fruiting body is an unusual colour, not rich purple, but rather a pale cold violet hue throughout. Old specimens fade to almost white in wet weather.

Also at Kongwak, we found fine colonies of *Amanita ochrophylla*, ranging from large specimens with a spread of ten inches down to quaint buttons. Young specimens have the typical pyramidal warts on the cap, but these flatten out into an attractive pattern as the plant

ages. The gills are a rich creamy colour and smell nutty and wholesome. According to Mr. J. H. Willis, this species may prove to be edible. *Amanita umbrinella* grew nearby; this is a more graceful fungus with a satiny grey cap decorated with a few mealy patches and white gills. Were these two not of the genus *Amanita* we would have popped them in the pan long ago.

The *Clavariacea* were well represented with pale lemon spikes appearing amongst the leafy debris and masses of the buff-coloured *Ramaria*. Rotting logs sprouted colonies of other bushland gems which amateurs hesitate to name with certainty. *Schizophyllum* and *Hypholoma* formed fan-like communities on old stumps.

Amongst the boldest colours of the ground-dwellers are the *Russulas*. *R. emetica* has a scarlet cap and *R. mariae* is a rich purple. Both have pure white gills and the stalks are usually tinged with the cap colour. One that always gives me great pleasure to find is another of the *Amanitas*. This is *A. pulchella*, just as showy as the introduced *A. muscaria*, but growing singly and not in colonies. The scarlet-orange cap bears a few white warts towards the centre, the gills and stem being a clear white. A delightful thing, seldom more than three inches across.

A. muscaria, the Fly Agaric, has been reported this autumn from numerous places around the pine plantations in the Childers district in the Gippsland hills and under homestead pines from hill areas further east at Ryton and Beech Hill.

Appeal to ALL Naturalists

It seems quite remarkable that in a club boasting approximately *one thousand* members, all of whom are ostensibly field naturalists, there should be such a dearth of field observations that during the past four months, only five letters containing material for this feature, *Bush Brushes*, have come to hand. Our stockpile has now run out.

These two pages can be continued only if *all* members are willing to participate. The Field Naturalists Club is justifiably proud of this magazine because it is the only monthly publication of its nature available in the whole of Australia. But we have reached a point where greatly increased co-operation from members is necessary if the high standard and size of the magazine is to continue unchanged.

Many of us make observations on different aspects of natural history quite regularly. Some are not so fortunate, but at the same time, are intensely interested in reading of others' experiences. Unfortunately, all too often we mistakenly consider our own observations to be commonplace, and of little more than passing interest to ourselves. Thus it is left to a few stalwarts to keep these columns "alive" with their observations.

All of us should be aware of the value of independent observation, and when a medium such as these columns does exist for the dissemination of our experiences, we should take advantage of it and share our good fortune with others.

We are usually willing to move ourselves if we are given sufficient cause. We are zealous in the support of campaigns to prevent the alienation of National Parks and to restrict the collection of specimens by the British Museum. Although very necessary, the function of any group of Naturalists is not *only* the conservation of habitat and the preservation of species therein. Surely it is just as important to extend the recorded knowledge of our natural heritage.

To this end I earnestly implore all readers who are sufficiently patient or who are fortunate enough to make any observations which could be of interest to their fellows, to send them in. Even if you are uncertain of the implications involved, *your* observations can be of great value. If *you* feel that these columns are worthwhile, then help us to continue them.

R. H. J. McQ.

Nature Notes from Ringwood Field Naturalists Club

A new record for our area was the sighting of a Powerful Owl *Ninox strenua* at South Warrandyte. The bird was on a branch about 14 feet above the main Ringwood road and was first seen in the car headlights. Fortunately it remained in the same place until we returned with a spotlight. This enabled positive identification to be made. Our fauna survey group has observed the Powerful Owl on a number of occasions while spotlighting.

Mrs. E. Moore reported another unusual visitor, the Great Egret *Egretta alba*. This solitary bird was seen feeding around the edge of a dam at North Ringwood. Although we occasionally see spoonbills in the area, this is the first time this egret has been noted. An interesting report from J. Pearson, was of a flock of pelicans which circled the Ringwood Lake and then flew away in a southerly direction.

Mr. J. Hyett reported at our July meeting that the Red-capped Robin *Petroica goodenovii* had been seen at Wantirna South. This is unusual as the bird is not usually found so far south. Nodding Greenhoods *Pterostylis nutans* were found in full flower at the Gurdies on May 24 this year. This was thought to be rather early as they were flowering profusely and still budding at North Warrandyte in mid-July.

Early in June the Banded Greenhood *Pterostylis vittata* was found in the Frankston-Langwarrin area. Growing nearby were the Striated Greenhood, *P. alata*, the Trim Greenhood *P. concinna* and the Nodding Greenhood *P. nutans*. The Gnat Orchid *Acianthus exsertus* has been flowering and the Mosquito Orchid *Acianthus reniformis* was nearly in bloom.

Signs of spring are the Scented Sundew *Drosera whittakeri* in full bloom and the first flowers of False Sarsaparilla *Hardenbergia violacea* appearing.

On Mr. Jack Truscott's property at North Ringwood the Bell Miners are busy building their nests.

The Name "Mulga"

By J. B. Cleland

Why does Miss Jean Galbraith*, in her interesting accounts of the Acacias, use the term Grey Mulga for *Acacia brachybotrya* and Silver Mulga for *A. argyrophylla* (*Vict. Nat. 80 (10)*, Feb. 1964, p. 321)—species not related in any way to mulga? According to Professor Morris (*Austral-English*, 1898, p. 305), the first use of the term "mulga" is in 1864 in the account of McDouall Stuart's Expeditions. This is understandable as he was probably the first explorer to meet with dense mulga thickets ("mulga scrub", Morris, p. 306) and might quite naturally ask a native what the trees were called. As the tree would be of use to the aborigines in various ways ("mulga apples"—edible galls, "mulga sugar" from coccids, the wood for weapons), it would probably have a name of its own. In Central Australia one may have open mulga plains with scattered trees, denser mulga but room to negotiate a Land Rover easily through the trees, and very dense mulga scrub requiring knocking much of it down—an alarming experience viewed from the cabin of the Land Rover.

Plants botanically identified as *Acacia aneura* vary much in the field. The trees of mulga scrub on the plains may be considered as typical "mulga", probably being the tree so called by the natives. It has slender phyllodes of uniform length. But even here differences occur—some young plants are greyer than others, some half-grown trees have horizontal branches, some have a better food value for cattle than others and these can be recognized by bushmen; the trees on rocky hills differ. Occasional mulgas with broad phyllodes (*A. aneura* var. *latifolia*) are easily recognized. The *A. aneura* complex wants careful study to see whether stable varieties can be hall-marked.

In South Australia mulga appears at 36 miles from Port Augusta on the Woomera road. It extends down to Tietken's Well near Maralinga and to Ooldea in the west of South Australia. On the Wentworth-Broken Hill road a mulga patch was noted 98·5 miles north of Wentworth (71 miles from Broken Hill).

Finally, may I express strong disapproval of artificially coined vernacular names which have no standing outside Victoria. My old friend, Dr. C. Sutton, spent so much time in helping to forge them, and did so with so much enthusiasm, that I never liked to question their value, but it has always seemed to me a real disservice to science. It is as easy to say *Hibbertia* or *Pimelea* as *Geranium* and *Pittosporum*. A native name or a spontaneous name is allowable—blackboy or grass-tree—but certainly not a mistake like "yacca".

Addendum July 28, 1964.

I think I have found why *Acacia argyrophylla* was given the vernacular name of a mulga. The mulgas belong to the Subsection Juliflorae with cylindrical or oblong spikes. J. M. Black

* Miss Galbraith was no doubt following the terminology of A. J. Ewart (1930) *Flora of Victoria*, p. 591, but this hardly affects Sir John Cleland's thesis.—Editor

(1948) *Flora of South Australia* places it in Subsection UNINERVES with globular heads next to *A. brachybotrya* where it clearly belongs. In South Australia the plant grows by the roadside on the Angaston-Swan Reach Highway on the hill before descending on to the Murray Flats. It was in bud and flower on 18/7/64 and the buds were slightly elongated —one was 7 x 5 mm.—though the flowers looked globular. It was thus technically in the Suborder JULIFLORAE.

F.N.C.V. Visit to Mt. Buller—Christmas 1963

Part 1—Plants and Animals

After Christmas activities a bus load of field naturalists left the city at 9.15 a.m. on Boxing Day, 1963, for Mt. Buller. The temperature was pleasant as we drove out through Healesville and Alexandra along the Maroondah Highway.

We stopped for lunch on a bridge near Yarck and were interested to see men cutting *Phalaris tuberosa* with a reaper and binder, with two groups of three men stacking the sheaves into stooks. As we looked downstream we were delighted to see a Rainbow Bird (*Merops ornatus*) showing himself plainly on a dead branch which projected over the water.

Passing the Eildon Weir, Hardhead (*Nyroca australis*) were seen on an inlet and a number of White-faced Heron (*Notophoyx novaehollandiae*) and Little Black Cormorants (*Phalacrocorax melanoleucus*). There were Spur-winged Plover (*Lobibyx novae-hollandiae*) in the paddocks. Near Mansfield River, Red Gums (*Eucalyptus camaldulensis*) were noticed, many almost defoliated apparently by stick insects. Around Merrijig were many Candlebarks (*Eucalyptus rubida*), some showing beautiful red streaks in the bark, and there were some Red Box (*E. polyanthemos*). In the vicinity of Mirrimbah some Blue Gums (*E. bicostata*) were noticed and a great quantity of Peppermint (*E. radiata*). From about 3,000 feet Woollybutts (*E. delegatensis*) dominated the forest to about 4,000 feet when Snow Gums (*E. pauciflora*) took over to about 5,000 feet, while the top of Mt. Buller was treeless. Some Messmate (*E. obliqua*) was seen on the road from Mt. Stirling to Mirrimbah and *E. viminalis* was recognized on the Howqua. Prominent on the roadside ascending from Mirrimbah were Hop Bitter-pea (*Daviesia latifolia*) as very large bushes, *Veronica derwentia* with bright mauve to white flowers, Clustered Everlasting (*Helichrysum semipapposum*), Hyacinth Orchid (*Dipodium punctatum*), large Blue-bells (*Wahlenbergia communis*), *Oxylobium alpestre* in golden masses and Christmas Bush (*Prostanthera lasianthos*).

Approaching the ski village the driver showed his skill as he nursed the full bus in the dark up the steep, stony road to the Ivor Whittaker Memorial Lodge.

On the first morning the party divided up into small groups and in the bright sunshine wandered around the slopes near the Lodge looking for flowers, taking photos or watching birds. Looking down towards the new road which had only recently been completed it was interesting to see the work which had been done on the steeper banks by the Country Roads Board. The surface had been painted with tar, seed sown and the whole held in place with bundles of straw and wire-netting. The grassland of the ski runs was made colourful with introduced plants, the red bloom of sorrel and lush green of clover dotted with the bright yellow heads of dandelion (*Taraxacum officinale*). The Yam (*Microseris scapigera*) and the flat weed (*Hypochaeris radicata*) made golden masses, and many other natives bloomed in profusion, including White Purlane (*Claytonia australasica*) flat on the earth, open only in the warm sun, shrubby *Hovea longifolia* with purple pea-flowers, Mountain Pepper (*Drimys lanceolata*) with insignificant greenish creamy flowers, Alpine Mint bush (*Prostanthera cuneata*) with mauve

flowers, bright gold to orange Ivy Goodenia (*Goodenia hederacea*) in flat masses on the ground, Trigger Plants (*Stylidium graminifolium*) with vivid pink flowers, numerous clumps of Purple Violet (*Viola betonicifolia*) varying from white to deep purple, grey-leaved white *Olearia phlogopappa* var. *subrepanda*, Tall Riceflower (*Pimelea ligustrina*) usually visited by many butterflies, moths and bees. White starry Prickly Star-wort (*Stellaria pungens*) and *Poranthera microphylla* with small white flowers were common.

Wherever there was a cleared patch between the Snow Gums the golden peabush (*Oxylobium alpestre*) flourished and Pale Vanilla-lily (*Arthropodium milleflorum*) was beginning to flower.

In the Snow Gums around the ski village Flame Robins (*Petroica phoenicea*) showed flashes of bright colour and the beautiful Grey Shrike-thrushes (*Colluricincla harmonica*) cocked their beady brown eyes. Thornbills, White-browed Scrub-wrens (*Sericornis frontalis*) and Grey Fantails (*Rhipidura flabellifera*) flitted among the bushes. High in the tree-tops Pardalotes were heard, while noisy flocks of Ravens (*Corvus coronoides*), Grey Currawong (*Strepera versicolor*) and Crimson Rosellas (*Platycercus elegans*) flew overhead.

In the afternoon we ascended Mt. Buller. Leaving the Snow Gums behind we walked over blue-green snow-grass and over stones of metamorphic sandstone where the great variety of plants resembled a huge rock garden. In addition to the *Hovea* and *Oxylobium* were found pink *Pimelea alpina*, yellow Common Butter-cup (*Ranunculus lappaceus*) and *Ranunculus gunnianus* with finely divided leaves. In damp patches *Richea continentis* was sending up its creamy spikes, mats of Fan-flower (*Scaevola hookeri*) made low rosy patches, gleaming clusters of white *Epacris paludosa* shone among their dark green spiky leaves and the strange Alpine Everlasting (*Helichrysum hookeri*) skirted edges of the wet places, a large pink willow herb, *Epilobium* sp., also flourished here. In the sphagnum bog the little flat Snow-wort (*Diplaspis hydrocotyle*) showed dry umbels of fruits and bright green mats of *Scleranthus biflorus* were seen. Clumps of Alpine Leek-orchid (*Prasophyllum alpinum*) and Green Bird-orchid (*Chiloglottis conferta*) were in damp areas. *Veronica serpyllifolia* and Mountain Club-moss (*Lycopodium fastigiatum*)

Woollybutt forest in the Mt. Buller area. Note lack of undergrowth.

Photo: *J. Ros Garnet*

with clubs about two inches long, sheltered under shrubs in damp spots also.

Growing between the granite and sandstone rocks were Mother Shield-fern (*Polystichum proliferum*), Alpine Waterfern (*Blechnum pennamarina*) and Necklace Fern (*Asplenium flabellifolium*) and, in the crevices of the basalt, Brittle Bladder-fern (*Cystopteris fragilis*). *Orites lancifolia* with curly creamy flowers in spikes grew near the basalt columns. Alpine Plum-pine (*Podocarpus lawrencii*) showed pinkish clusters of staminal flowers on the male plants and bright red fleshy attachments to the seed on the female plants. The yellow-flowered Leathery Starbush (*Pleurandropsis trymalioides*) and the related cream-flowered *Phebalium phylicifolium* were prominent shrubs, as was *Westringia sentifolia*. *Grevillea australis* had tiny white flowers and the Rosy Heath-myrtle (*Baeckea ramosissima*) grew espaliated on the rocks, while yellow *Bulbine bulbosa* lily and orange Billy Buttons (*Craspedia uniflora*) flourished on the slopes. *Plantago tasmanica* with velvety leaves in starry rosettes and *Aciphylla glacialis* with palm-like pointed leaves were also conspicuous.

Daisies were numerous, including the little Bottle-daisy (*Lagenophora stipulata*), the Coarse Daisy (*Brachycome aculeata*) and *Brachycome rigidula* and *B. decipiens*. The common everlasting (*Helichrysum scorpioides*) and yellow Hoary Sunray (*Helipterum albicans*) were there. *Podolepsis robusta* was an-

other composite which looked like an everlasting.

On the summit the party sat in groups looking down on ridge after ridge of blue hills and watched Nankeen Kestrels (*Falco cenchroides*) hovering below and while descending heard Pipits (*Anthus australis*) calling as they perched on the tops of the low scrub, saw Welcome Swallows (*Hirundo neoxena*) circling after insects and flocks of Silvereyes (*Zosterops halmaturina*) flying in gusts from one nectar-bearing clump of shrubs to the next.

On Saturday the party set out in the coach for Whitfield, Power's Lookout and Paradise Falls. Blackbacked Magpies (*Gymnorhina tibicen*), Mudlarks (*Grallina cyanoleuca*) and Willie Wagtails (*Rhipidura leucophrys*) were looking for food by the roadside. A group of Yellow-tailed Black Cockatoos (*Calyptorhynchus funereus*) was seen and Eastern Rosellas (*Platycercus eximius*) flew past with a flash of bright green. Galahs (*Kakatoe roseicapilla*) and White Cockatoos (*K. galerita*) were seen in the paddocks.

As we ate lunch on an outcrop of rock near Power's Lookout, we saw clumps of purple-mauve Rock Isotome (*Laurentia axillaris*) at our feet and Little Skinks (*Leiolopisma guichenoti*) scuttling off into crevices. Growing among the rocks near the look-out was Common Fringe-myrtle (*Calythrix tetragona*) showing the reddish persistent, tailed calyx. *Bursaria spinosa* and Holly Lomatia (*Lomatia ilicifolia*) with its creamy flowers, Pale Wedge-pea (*Gompholobium huegelii*) with pale yellow flowers and Prickly Geebung (*Persoonia juniperina*) with flowers of bright gold, all made patches of colour. The Hop-bush (*Dodonea cuneata*) added beauty with the branches fringed with soft green lichen and its magenta fruits showing against the grey rock and the blue distance. In this area also there were the Burgan (*Leptospermum ericoides*) with long sprays of white flowers, Small-leaf Parrot-pea (*Dillwynia parvifolia*) in flower, *Pultenea cunninghamii* with its wide green leaves and orange-yellow flowers, also the Dogwoods (*Cassinia longifolia*) and *C. aculeata* and quantities of *Wahlenbergia* with bright blue flowers. *Grevillea alpina* was in flower and the tiny *Boronia nana* with slender stems and little pink flowers sheltered in tufts of grass. Blue Pincushions (*Brunonia australis*) showed delicate blue heads among the rocks and the twining *Hardenbergia violacea* had finished flowering. The Tree Violet (*Hymenanthera angustifolia*) showed insignificant creamy flowers and round purple fruit, and Dwarf Rice-flower (*Pimelea humilis*) and pink Austral Centuary (*Centaureum pulchellum*) were there too. Healthy plants of Nodding Blue-lily (*Stypandra glauca*) were seen, but not in flower. Spreading Flax-lily (*Dianella revoluta*) was plentiful and flowering in big generous sprays. The Yellow Autumn Lily (*Tricoryne elatior*) was flowering too.

It was unfortunate that time did not allow everyone to make the long climb down below the sheer cliff face of pinkish rock from which the Paradise Fall dropped in a vertical silver ribbon. The few who did were torn between the need to return to the waiting party and the wish to absorb the timeless atmosphere of the place with its giant monolith and the lush growth at its foot or to wonder what birds had perched on the whitened ledges of the cliff face where Cut-leaf Crane's-bill (*Geranium pilosum*) maintained a precarious foothold.

Sunday morning was warm and sunny and was spent by us around the village. We wandered along the hillside overlooking the steep descent into the distant Howqua valley, tantalized by the swinging ropes of the ski-runs and charmed by the natural rock gardens. Here soft grass and mosses sheltered under rock ledges and overhanging lichened branches. Snow Daisy-bush (*Olearia lyrata*), Alpine Daisy (*Brachycome nivalis*) and Silver Daisy (*Celmisia longifolia*) grew in patches of sunlight and were visited by black and yellow striped beetles. Clumps of Eyebright (*Euphrasia collina*) grew along the track with sprays of Pale Vanilla Lily (*Arthropodium milleflorum*) and Gorse Bitter-pea (*Daviesia ulicina*) was flowering and, in a depression, dense shrubs of Yellow Bottle-brush (*Callistemon sieberi*) were in bud.

After a twelve o'clock lunch the afternoon walk to Little Buller began with a difficult trudge below an outcrop of fractured basalt. Walking became treacherous when the uneven rocky surface was covered by springy grass and low bushes, and we were glad to stop to look at a young mountain grasshopper, which stayed just long enough to be photographed. When the ridge of Little Buller was reached, the hardy were rewarded

by seeing a natural garden of Trigger Plant (*Stylidium graminifolium*) and blue Digger's Speedwell (*Veronica perfoliata*) growing so profusely that it was almost impossible to take a step without treading on a plant. Here a healthy bush of Royal Grevillea (*G. victoriae*) had scarlet flowers and strong plants of Tasman Flax-lily (*Dianella tasmanica*) were growing. Along the rocky ridge approaching the Little Buller summit there was a strong wind blowing, and ants were in profusion and if one stood in one place even for a minute swarmed up the legs and over any photographic equipment put on the ground. A squirming mass of saw-fly grubs was seen on a stunted Snow Gum branch here.

Among other flowers, Alpine Boronia (*Boronia algida*) had small pink flowers and Rough Coprosma (*Coprosma hirtella*) had small greenish-cream ones. The small white flowers of *Grevillea australe* were very sweet-smelling and *Microtheum hexandrum* had brown capsules. Returning through a damp spot a mass of *Marchantia* showed quantities of female heads. Carraway (*Oreomyrrhis andicola*) showed its characteristic umbels of fruits.

Our friends from the ski village, Mr. and Mrs. James, thoughtfully drove in a jeep across to the track leading from the ridge of Little Buller and met the weary remnants of the party with welcome cups of tea. This kindly act and the stalwart leadership of Mr. Doughty and Mr. Miller added greatly to the success of the day.

On Monday, Mt. Buller was shrouded in fog and the proposed bus trip had to be cancelled. Instead the party walked towards the Woollybutt Saddle along the jeep track which had been built for fire-fighting. The sun was shining as we walked along this track. The white *Caladenia lyallii* was found and the Potato Orchid, or Cinnamon Bells (*Gastrodia sesamoides*). The little pink flowers of Wild Raspberry (*Rubus parvifolius*) were common, and the most showy shrub we saw was a Cascade Everlasting (*Helichrysum thyrsoideum*) with hanging branches covered with showers of tiny white flowers. Here we saw *Acacia juliflormis*, which had wide, flat pods and blue green phyllodes. A Black-faced Cuckoo-shrike (*Coracina novae-hollandiae*) flew over while we were having lunch, and great flocks of Ravens (*Corvus coronoides*) circled over Mt. Stirling, adding to the atmosphere created by the black storm-clouds which blew up again in the afternoon.

Tuesday was spent on a bus trip around Mt. Stirling first down to Mirimbah on the Delatite, then around the Howqua Valley and back through the Delatite Valley. Passing around Woollybutt Saddle, Blanket-leaf (*Bedfordia salicina*), Musk Daisy-bush (*Olearia argophylla*) and Mountain Hazel (*Pomaderris aperula*) were growing. There were also a fine-leaved Elderberry Panax (*Tieghemopanax sambucifolius*), Blackwood (*Acacia melanoxylon*), *A. dealbata*, Banyalla (*Pittosporum bicolor*) and Prickly Currant-bush (*Coprosma quadrifida*), which was common, and Sassafras (*Atherosperma moschatum*).

The bus stopped near a tributary of the Howqua and the party was led in single file through thick growth above the stream to see the falls which tumbled in a sparkling silver shower against the dark rock face to splash into the stream below and be lost amid the tree-ferns.

The lunch stop was made on the Howqua near a deserted timber camp. Between the edge of the road and the thick growth by the stream a copperhead snake (*Denisonia superba*), about four feet long, was found.

There was Woolly Tea-tree (*Leptospermum lanigerum*) overhanging the stream, and flirting along the branches catching insects was a Rufous Fantail (*Rhipidura rufifrons*). Elderberry (*Sambucus gaudichaudiana*) was in flower and Mountain Correa (*C. lawrenceana*) was plentiful. Little blue Forget-me-not (*Myosotis australis*) was plentiful. Bugle (*Ajuga australis*), Selfheal (*Prunella vulgaris*) and two species of *Senecio* were flowering, Variable Groundsel (*S. lautus*) and Austral (*S. linearifolius*). A white *Glycine clandestina* climbed on the shrubs. *Leucopogon hookeri* had numerous berries and so did the little Woodruff. The dainty blue *Veronica gracilis* was growing profusely near the stream.

The return drive round the foot of Mt. Stirling gave wonderful views of the ranges beyond, including Mt. Howitt and the distinctive, serrated outline of Mt. Cobbler.

On Wednesday the homeward journey was through Glenburn, where we had lunch by the stream. Growing there we saw Forked Sundew (*Drosera binata*) and *Lomatia longifolia* with its cream grevillea-like flowers. Our last stop was

at Mt. Slide where Fringe Lily (*Thysanotus tuberosus* was growing.

Here we looked down towards the Dandenongs and Melbourne, and our thoughts turned to home and work ahead. We returned enriched with memories of bright sunshine, warm companionship, and the beauty of the flora and fauna of the "high country" in summer.

L. M. WHITE (Botany)
JOAN M. FORSTER

F.N.C.V. Club Library—Missing Books

Section: Geology; Geography — *Study Group Librarian:* Mrs M. Salau

Book No.	Author and Title
A1/2	Origin of continents and oceans
A1/4	Guide to collection of minerals in National Museum
A1/6	Ball: Story of the heavens
A1/10	McCoy: Prodromus of palaeontology in Victoria
A1/12	Wood: Geological observations in South Australia
A1/14	Madigan: Central Australia
A1/15	Hills: Physiography of Victoria (copy 1)
A1/17	High mountain catchments in Victoria
A2/3	Miller: Footprints of the Creator
A2/4	Maury: Physical geography of the sea
A2/7	Grew: Romance of modern geology
A2/10	Jeans: Through space and time
A3/6	Watts: Geology for beginners (copy 1)
A3/8	Chapman: Australian fossils
A3/18	Hall: Victorian Hill and Dale (copy 2)
A3/19	Woods: Palaeontology (copy 1)
A3/21	Wood Jones: Coral and atolls
	David: Geology of Australia

Section: Botany — *Study Group Librarian* Mr J. A. Baines

Book No.	Author and Title
F1/3	Mueller: Acacias — copy 1
F1/10	Grove: Trees and their life history
F1/10	Grimwade: Anthography of the eucalypts
F1/11	Lord: Shrubs and trees for Australian gardens
F1/22	Hutchinson: A botanist in South Africa
F2/10	Guilfoyle: Australian plants
F2/13	West: Algae — vol. 2
F2/18	Audas: Native trees of Australia
F2/26	Laurie: The food of plants
F2/33	Lubbock: On buds and stipules
F3/8	Bailey and Good: Plants poisonous to stock
F3/9	Mueller: Botanic teachings
F3/10	Weston's Flora
F3/24	Revised list of fruit trees
F3/16	Daley: Baron Ferdinand von Mueller
F3/17 and 18	Classification of flowering plants, 2 vols.
F4/13	Elliott: Romance of plant life
F4/22	Rupp: Guide to orchids of New South Wales—copy 2
F4/31	Cooke: Introduction to study of fungi
573	Macdonald: Introduction to mycology

This is merely a selection of books missing from the section. Members holding any books or periodicals from the library are urged to return them as soon as possible, both out of consideration for fellow-members and to avoid the necessity of further action being taken for recovery or replacement. Any information as to the whereabouts of missing books or periodicals would be welcomed by the club librarian or the appropriate group librarian.

Field Naturalists Club of Victoria

General Meeting—August 10, 1964

In spite of the cold wet weather there was a large attendance of Members and friends when the President, Mr. M. K. Houghton, opened the meeting at 8 p.m. He reminded those present that the Nature Show would be held August 31-September 2, before the next General Meeting, and asked the Chairman of the Show Committee Mr. D. E. McInnes to speak. Mr. McInnes said that preparations by the committee were well advanced. In regard to advertising the Show, leaflets, in packets of about 90, were available for distribution through State Schools not already on the list and those taking a packet should add the name of the school to the list. Advertising cards for shop windows and car stickers were also available. He asked members to assist in the collection of live exhibits shortly before the Show, spiders, aquatic insects and reptiles, and appealed to owners of utilities to assist with transport to the Lower Town Hall on Sunday, August 30, and to remove exhibits late on September 2.

The President circulated roster forms for those able to assist in manning the exhibits and asked for them to be returned within 2 days. Work in mounting the show would commence at 9.a.m. on the Sunday.

Mr. Coghill mentioned that the Club had once again to thank the Ingram Trust for meeting the cost of the Show leaflets. He reported that A.B.C. Television had approached the Club for someone to assist in the production of school nature-study telecasts and asked anyone interested to contact him. He appealed once again for an Assistant Secretary.

Mr. Lloyd Williams was the speaker for the evening, his subject "A Naturalist in Thailand". Although often regarded as a small country, Thailand extended about 1,000 miles from its northern boundary with Laos to its boundary with Malaya in the south. The vegetation of the mountainous country around Chiengmai in the north, differed from that of the dry belt in the north-east and both these differed again from those of the flat central rice plain and of the narrow isthmus of Kra. Mr. Williams described and showed excellent slides of many plants growing in the different areas, paying particular attention to those of economic importance. In addition to rice, bamboo, teak, kapok and palms, such as sugar palms, coconuts, *Areca* and thatching palms, the speaker mentioned bananas, papaya, mango and other fruits. The value of the Rain Trees *Enterolobium saman*, in providing shade along roads and gardens, was stressed and pictures of the Flame of the Forest *Poinciana* sp., Crepe Flower *Lagerstroemia* spp., several species of *Cassia*, the Pradu Tree *Pterocarpus cambodianus* and other ornamental trees were shown. The story of the Bo Tree *Ficus religiosus* was told and Mr. Williams concluded with orchids, water-lilies and the Water Hyacinth *Eichhornia crassipes*.

The President thanked Mr. Williams for his most interesting talk and the audience showed its appreciation with applause.

The New Members listed on page 123 of the August *Naturalist* were elected on the motion of Mr. Coghill, seconded by Mr. Begley, and in drawing attention to the Group Meetings, the President mentioned that the next meeting of the Entomology and Marine Biology Group would be at Mr. Strong's residence.

Attention was drawn to the new book *Australian Honeyeaters* by Brigadier Hugh Officer which was obtainable from The Hon. Secretary, Bird Observers Club, 59a Upton Road, Windsor, S.1, for 19/- posted.

Mr. Harrison spoke on an exhibit, an agate quartz stone weighing 12 lbs. that he had collected in the tidal zone east of Devonport, Tasmania. The stone, which bore some resemblance in shape to the cranium of a skull, was very hard indeed but had been polished. Mr. McInnes showed how glare when using top lighting could be reduced by a black cardboard cylinder attached by a rubber band to the objective lens. He mentioned that 105 F.N.C.V. microscopes had now been made and sold. Mr. Woollard showed a revolving stage that he had designed at the instigation of Mr. McInnes. Sori of ferns were shown under microscopes. Mr. Francis displayed a specimen of the rare mineral, selwynite from Heathcote.

Botany Group—July 9, 1964.

The Group met at the Herbarium on the 2nd. Thursday of July.

The Group Chairman, Mr. Bruce Fuh-

rer, was in the chair and 17 Members were present.

The subject of the evening was Lichens.

Mr. Rex Filson spoke on this widespread and complex family. He explained the interesting botanical make-up, the distribution, and the uses made of lichens. Specimens were exhibited and color slides, some of which were taken by Mr. Filson in Antarctica, were shown. Mr. Filson's knowledge of the subject and his ability as a lecturer made this talk an outstanding contribution to the Group's activities.

The next meeting will be held at the Herbarium at 8 p.m. on Thursday August 13, when Mr. Mitchell of the Soil Conservation Branch will speak on the use of plants in the conservation of soils. Visitors are welcome at all Botany Group meetings.

Botany Group—August 13, 1964

Mr. Bruce Fuhrer, the Group Chairman, introduced Mr. Mitchell of the Soil Conservation Authority who addressed members on the work being carried out to combat erosion and, in particular, the plants being used for regeneration of the soil. Many slides were shown and a most informative and interesting evening resulted. An excursion is to be held to Rosebud in September and other excursions by members are to be arranged to Monbulk and to the Blackwood area. Club members are invited to attend Group excursions.

Microscopical Group—June 17, 1964

Twenty-five members and visitors attended this meeting which was chaired by Mr. LeMaistre.

Members stood and observed one minute's silence as a mark of respect for the late Mr. Tarleton Rayment who was a very active member of the Club and who had given the Group a number of talks. A letter from the Junior Group of the Ararat F.N.C.V. requesting help was discussed.

Dr. A. Nichols from the Fisheries and Biological Control Section of the C.S.I.R.O. was guest speaker for the evening and gave the group a most interesting talk on Marine Plankton. With the aid of 35 mm. microphotographs he described the various types of plankton commencing with phytoplankton such as diatoms which are essential as food for the zooplankton. He then went on and described dinoflagellates, the protozoans such as noctoluca which are responsible for the luminosity of sea at night, the larval stages of polychaete worms, Coelenterata, arrow worms and the Crustaceae which is one of the biggest groups in the sea and is the form of life in which the speaker specialized.

Finally the Group was given much factual information on the "vertical migration" which takes place daily and is still unexplained.

Mr. LeMaistre on behalf of those present thanked the speaker for one of the Micro Group's most interesting talks.

Microscopical Group—July 15, 1964

About 20 members attended this meeting which was chaired by Mr. E. LeMaistre.

Mr. D. McInnes reported that he had attended a meeting of the Geelong F.N.C.V. where he had delivered 9 Club microscopes and had been made most welcome. This brought the total of microscopes sold to 100 and, in recognition of their services, the Club had be-

stowed Life Membership upon Mr. W. Woollard and Mr. D. McInnes.

It was a "gadget night," and consequently a most formidable battery of microscope accessories were on display, mostly home-made from various easily-acquired odds and ends.

Mr. E. LeMaistre had on display a cabinet made by the late Dr. Bob Wishart, made entirely of empty matchboxes, a most useful article for the storage of all sorts of microscopic necessities. He then described the method that he used in the preparation of both glass and nylon micro-pipettes, his experiences in having manufactured an angle eyepiece and he displayed his records of the West and West book on desmids which were made entirely on 35 mm. slides.

Mr. J. Daws displayed a most useful pair of binoculars which, because of the attachment of close-up lenses, make the search for specimens very easy for they can be examined many feet away.

Other members displayed a micro-tank, a slide cabiner, a very elaborate vertical illuminator and a watchmaker's *loupe*, while another member described the use of Durex tape for slide making and a Junior member displayed and described a very good rock section.

Mr. W. Woollard informed the group that a micro-light-meter kit can now be obtained for as little as £3 and that the telescopic rifle-sights, which may be used for making a binocular dissecting microscope, are now available.

The night was so full of interest that members ran out of speaking time rather than gadgets to speak about and all benefitted from the new ideas.

Geology Group—August 5, 1964.

Twenty-six members were present with Mr. L. Angior in the chair. Mr. Dodds reported on the excursion to the Limestone Quarry at Lilydale, on July 5, when about thirty members and friends attended. Many fossil corals and shells were collected, also calcite crystals, copper ore in veins and sheared pebbles. The Older Basalt flows capped by Tertiary beds were examined and weathering effects noted. From a vantage point near the Quarry, Mr. Hemmy located the various land-marks and their geological origin.

The syllabus item for the evening took the form of a Discussion Night. The following members explained their exhibits, and showed colour slides on a variety of geological subjects: Mr. N. Wigmore: Series of Stereo-photographs assembled by Mr. F. Robbins, Bendigo, to illustrate the glacial pavements in the Eppalock area, in danger of being obliterated by the waters of the Weir. Mr. A. Cobbett: Limestone with calcite crystals and copper ore from Lilydale Quarry, noumeite (nickel magnesium silicate) from Noumea, fossil wood. Master R. Whatmough: various forms of calcite deposited in limestone cavities, corals in limestone and fossil shells, all from Lilydale Quarry, fossil fruit in brown coal from Yallourn, series of photographs taken on excursions to show xenoliths in granite, organ pipes (Sydenham), basalt columns. Mrs. Sulan: Limestone composed wholly of Sea-lily stems from Loyola. Mr. L. Angior (per Mr. Bairstow from overseas): chrome ore, calcite, granite from Ephesus, andesite, building stone from Turkey, calcite nodules, various sections of polished marble and limestone. Mr. W. Oakes: Collection of gem-stones and polished material, box of specimens polished by tumbling. Mr. D. McInnes: microscope exhibit of sections made from material supplied by Mr. D. Dangerfield, including fossil wood and silicified stones. Mr. H. Hope: Opals and polished stone from Lightning Ridge, aquamarines, petrified wood, rhodonite, jasper and bloodstone. Mr. J. Miller: Felspar porphry from Strahan, Tas. colour slides of limestone cliffs in the south-east of South Australia. Miss N. Carstairs: Tumbled stones, jasper, lace chalcedony and impure opal. Mr. R. Dodds: Collection of slides illustrating some land-forms in Tasmania.

Affiliated Clubs

Hamilton Field Naturalists Club

This active Club reports the usual round of lectures and excursions, highlights being discovery of several new series of aboriginal cave paintings. Incidentally, they are attempting to control vandalism in the famous Cave of Hands, by providing a Visitors Book for scribblers to scribble in.

Mr. F. M. Tucker continues as President and Mr. L. K. M. Elmore as Honorary Secretary.

Ararat Field Naturalists Club

Ararat Field Naturalists' Club, which had been in recess for a few years, was re-formed at a recent meeting presided

over by the Mayor, Cr. E. W. James. Mr. R. Warnock, whose color slide of a White-headed Stilt feeding young on a swamp near Willaura won an international award earlier this year, was elected president. Other office-bearers are vice-presidents, Rev. C. Burtt and Mr. A. Hargreaves; secretary, Miss Z. E. Banfield; committee Messrs C. Larmour, J. Stanwix and Miss L. L. Banfield. A number of junior members were enrolled at a nominal subscription.

The club has had talks by two Stawell members, Mr. I. R. McCann on "Fungi" and Mr. N. Bennett on "Crustaceans" and Mr. Warnock has created a good deal of interest in bird life by his outstanding color slides. The first excursions were to Mount Langi Ghiran to study the aboriginal drawings in "The Cave of the Serpent", fungi and birds, and to Mount William picnic ground to study orchids and birds.

The club is represented on the Grampians and District Tourist Association and McDonald Park Committee of Management and has undertaken to make a survey of the flora and fauna of the park. Members are looking forward with pleasure to a visit by Miss Ina Watson, of the Fisheries and Wildlife Department, on Monday, September 7.

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This photograph of one of Edith Coleman's Echidnas is taken from the November 1926 *Victorian Naturalist* 43: 127.

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The Victorian Naturalist

Editor: J. R. Hudson, B.Sc., M.R.C.V.S.

Assistant Editor: R. H. J. McQueen, B.Sc., Dip.Ed.

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Front Cover:

This picture illustrated an article entitled "The Rehabilitation of the Koala in Victoria" by the late Fred Lewis in the March 1954 issue of the *Victorian Naturalist* (70. 197). It shows some Koalas being released on Quail Island.

The Other Mallee in Victoria

By G. Blackburn*

Mallee vegetation in Victoria is identified in so many ways with the north-west of the State that other tracts are apt to be overlooked or designated as "whipstick" scrub.

The other mallee areas of Victoria escape popular attention today but they were crowded with gold-diggers about one hundred years ago. So far they have yielded mainly gold and eucalyptus oil. It is the poor quality of their soils rather than low rainfall which has preserved these pieces of mallee from farming, but progress in agricultural research may stimulate a demand for this virgin mallee.

It is peculiar that so little interest has been taken in the other mallee during this century. Kenyon's (1914) account of the mallee is concerned entirely with north-west Victoria; he mentioned only two nearby but detached mallee areas: the Little Mallee between the Avoca and Loddon Rivers and the Little Desert south of Nhill. Patton (1944) referred briefly to the existence of mallee near several stands of the box-ironbark association in Victoria. The map of Australian vegetation by Williams (1955) shows mallee only in the north-west and in the Little Desert. Most attention to the other mallee has come from field naturalists, as shown by the occasional references in past issues of the *Victorian Naturalist*.

The term mallee has been applied occasionally to several eucalypts not normally associated with the drier parts of Australia. This article is not concerned with such unusual references as "wet mallee" (Costin 1954) or the Gippsland mallee (*Eucalyptus kitsonii*) referred to by Hooke (1959) and Willis (1962), nor with the small area of *E. diversifolia* in the far south-west of Victoria (Willis 1962). The more orthodox usage of mallee, as of Blakely (1955) will be followed here.

The approximate boundaries of known areas of mallee vegetation in Victoria are shown in Fig. 1. The small patches outside the Mallee district lie mainly in northern Victoria and are separated from one another generally by wide valleys leading towards the Murray River. South of the main divide there is apparently only one district with mallee, in which small scattered patches occur between Melton and Ballan.

The various pieces of mallee outside the main zone are: in the Little Desert (Willis 1962); near Tooan and Lake Carchap; at Darragan (Audas 1928, Swaby 1936); St. Arnaud (Patton 1944, Palmer 1955); Wedderburn-Inglewood (Soil Conservation Authority 1963); Tarnagulla (Whitworth 1879); Bendigo-Kamerooka (Paton 1924, Audas 1936, Willis 1962); Rushworth-Whroo (Whitworth 1879, Paton 1924, Patton 1944); Gowangardie (Vroland 1937, Downes 1949); Melton-Bacchus Marsh (Patton 1944). There are some indications of mallee vegetation at Moorl Moorl, Yandoit, and Wehla but there is no definite information to justify their inclusion here.

* Division of Soils, C.S.I.R.O., Adelaide.

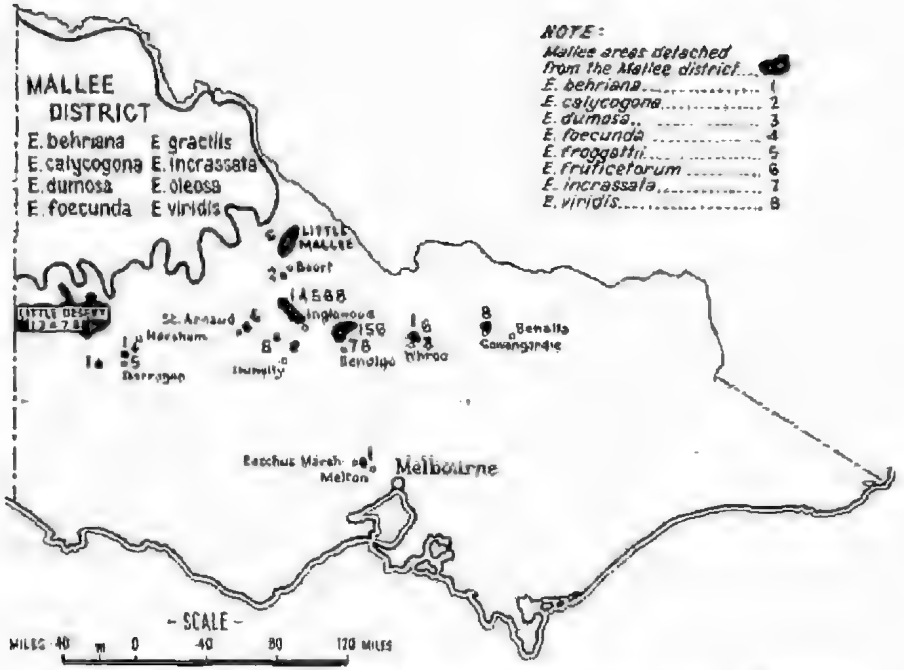

FIGURE 1—The other mallee in Victoria, showing distribution of their species of *Eucalyptus*.

Some indication of the distribution of different species of mallee eucalypts is shown also in Fig. 1, based on various publications, on information kindly given by Mr. J. H. Willis (National Herbarium, Melbourne), and on identifications supplied by Mr. D. E. Symon (Waite Agricultural Research Institute, Adelaide). The records show that eight mallee species of *Eucalyptus* (*E. behriana*, *E. calycogona*, *E. dumosa*, *E. foecunda*, *E. gracilis*, *E. incrassata*, *E. oleosa*, and *E. viridis*) are important in the north-west Mallee. Two of these (*E. gracilis* and *E. oleosa*) appear to be confined to that part of the State; the others occur in one or more of the other areas. One species, *E. froggatii*, has not been recorded outside the southern areas. *E. behriana* and *E. viridis* are probably the most widely distributed mallee eucalypts in Victoria.

A brief examination of *A Key to the Eucalypts* by Blakely (1955) suggests that approximately one fifth of the Australian species are characterized by mallee habit, a feature which occurs in many different subdivisions of this genus. The species found in the other mallee areas of Victoria are largely from the Porantheroideae of Blakely and especially from the Subbuxeales (mallee boxes). It is noteworthy that the species most characteristic of the other mallee in Victoria have been recorded also for the most easterly mallee in N.S.W. (Blakely 1955, Biddiscombe 1963).

The other mallee clusters near the main divide in Victoria. Its areas are separated from the north-west Mallee generally by wide expanses of riverine plains of the Wimmera and Northern districts, except near Boort and Horsham. Audas (1936) suggested that these scattered small areas may be the remnants of a once more

extensive belt of mallee. In support of this idea there are the indications that these other patches of mallee lie mainly on plateau formations associated with ironstone (laterite), which occur on many of the interfluve ridges along the inland slopes of the Great Dividing Range.

The soils of the other mallee are quite different from those predominating in the north-west Mallee. In the latter district the soils are mainly alkaline, often very calcareous, and the sand fraction is generally predominant. In the other mallee the soils are mainly acid loams over acid clay subsoils, and as one example of their distinction from the conventional notion of "mallee" soils, there is the recent recommendation by the Soil Conservation Authority (1963) that in using the mallee areas of the Wedderburn-Inglewood district for establishing subterranean clover pastures, lime and superphosphate should be used in conjunction with molybdenum.

Interest in the Victorian occurrences of mallee vegetation should not be confined to their botany and soils, which certainly deserve far more attention than they have had so far. An additional field of interest concerns the animal life associated with the mallee, an obvious example being the distribution of mallee fowl (*Leipoa ocellata* Gould). This bird is not confined to mallee areas but the mallee habitat is most common (Frith 1962). In Victoria one expects to have to go to the official Mallee to see this bird, or at least to the Lowan Sanctuary at Kiata, near the Little Desert. But the mallee fowl used to live in several of the other mallee areas and even now it is not quite extinct in them.

There are several references to mallee fowl in central Victoria. Whitworth (1879) mentioned its occurrence in mallee at Tarnagulla. Campbell (1885) referred to eggs taken from the Bendigo district and "from a species of mallee scrub between Melton and the Anakies." Dunn (1912) mentioned that several small gold nuggets have been found in mallee hen's nests. O'Donoghue and St. John (1910) stated the former occurrence of mallee fowl in the Brisbane Ranges. Palmer (1955) quotes early references to the consumption of mallee hen's eggs by gold-diggers. Disused mounds attributed to this bird have been recorded from the Brisbane Ranges (A. R. McEvey, personal communication) and according to Mr. M. C. Downes (Fisheries and Wildlife Department), the mallee fowl is not extinct in the scrub near Bendigo. It is very likely that a successful re-introduction of this species could be made to selected areas of mallee scrub in central Victoria.

Acknowledgement

The map was drawn by Mr. M. C. Coulls.

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F.N.C.V. Visit to Mt. Buller—Christmas 1963

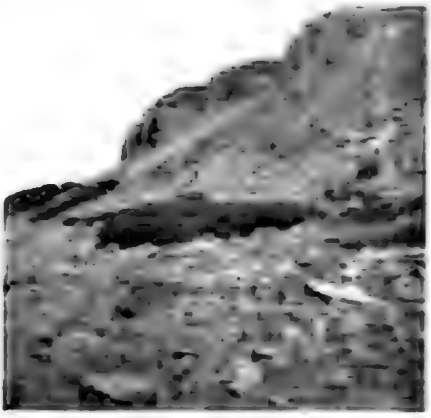
Part 2—Notes on the Geology of the Mt. Buller, Mansfield and Tolmie Districts.

The great variety of rock types and the complex geology of the Eastern Highlands of Victoria can be attributed to long periods of sedimentation in the Tasman Geosyncline, and to associated periods of mountain-building with faulting and igneous activity. The Tasman Geosyncline is a composite structural belt, most active during the Palaeozoic Era when it constituted a vast, unstable trough extending over much of what is now eastern Australia.

However, it is not the orogenesis of Palaeozoic times but the late Tertiary block uplift of a Mesozoic peneplain and vigorous stream erosion which has formed the present-day high country of eastern Victoria.

Mount Buller District

From Mt. Buller evidence of this post-Pliocene uplift, known as the Kosciusko Uplift, can be seen in the concordant summits of surrounding mountains. Mt. Buller itself is a composite peak; the great bulk of the mountain is an exposed area of discordant grànodiorite, but the resistant, and noticeably more rugged summit, and Little Buller are composed of hornfels derived from folded Palaeozoic sandstones. Just above the Alpine Village on Mt. Buller is a remnant of a formerly extensive area of quietly extruded basalt. This basalt belongs to the series known as the Older Basalts, of Lower Tertiary (Eocene to Oligocene) age, as distinct from the comparatively recent flows around the northern and western suburbs of Melbourne and in the Western District. The Older Basalts were once widespread over the surface of eastern Victoria and south Gippsland. Notable outcrops of the basalt



The Southern Scarp of Mt. Buller. Tumbled masses of basalt with patches of *Orites lancifolia*.

Photo: *J. Ros Garnet.*

showing polygonally jointed sections occur on the southern face on the track to Little Buller.

Also from Mt. Buller can be seen the arc of mountains extending from Mt. MacDonald in the south through The Bluff and Mt. Howitt to Mt. Cobbler in the north-east, stretching across most of the sandstone country of which these peaks are composed. This country is a NW.-SE. belt of conformable Upper Devonian and Lower Carboniferous sediments resting unconformably on older rocks beneath. The sediments, which together with the Grampians Sandstones of the same age, include the "red beds" of Victoria, and comprise sandstone, shale, and conglomerate of lacustrine and estuarine origin. Mt. Timbertop, to the west of Mt. Buller, has a small but conspicuous capping of this material. A rather gritty sandstone of this series was found in the upper reaches of the Howqua valley. The terrestrial nature and gentle dips of these rocks as a result of broad folding, apparent in the profile of Mt. Cobbler, are a reflection of the environment of deposition in the Upper Devonian; the southern part of the Tasman Geosyncline was largely stabilized, and broad, shallow basins covered earlier folded and consolidated sediments.

The neighbouring peak, Mt. Stirling, is composed entirely of granodiorite. The top is a very broad, exposed area and weathering has produced massive tors and boulders.

An outcrop of acid volcanic rocks was found at a waterfall on a tributary of the Howqua River, on the Howqua road below Mt. Thorne. These rocks belong to the Cerberean Volcanics, an Upper Devonian series of dacites, rhyolites, toscanites, and more basic lavas, genetically grouped with the lavas of the Dandenong and Macedon Ranges. At the falls the rock is sub-porphyritic. It appears to be interbedded with the Upper Devonian sediments.

The granitic rocks of the area range from a known occurrence of adamellite at Merrijig below Mt. Timbertop, through the granodiorite of Mt. Buller to a rock of more dioritic composition on Mt. Stirling where specimens of very well developed hornblende crystals were collected.

Mansfield District

The rocks which outcrop most extensively in the Mansfield district are the arenaceous Upper Devonian and Lower Carboniferous terrestrial sediments, and the thick marine sediments of Upper Silurian to Lower Devonian age, similar to those of the Melbourne district. There is a tectonic break at Mansfield between these two series of sediments.

Mansfield lies at the western end of the Sandstone Belt of terrestrial sediments which extends south-east to Briagolong in east Gippsland. At Mt. Battery (1,760 feet), two miles from the township, the sediments are nearly horizontal, producing a flat-topped hill with surrounding benches at different levels. The presence of the Upper Devonian/Lower Carboniferous here at a much lower altitude than that further east is indicative of faulting in the area.

Silurian sandstones which pass into Lower Devonian are widespread west and south of Mansfield. In contrast to the continental deposits, no volcanics are associated with these rocks. The Mansfield district is also known for compound cauldron subsidences with ring dykes and fossil fish and plant remains.

Tolmie District

Most of the hilly country from Mansfield to Tolmie consists of comparatively shallow, low-level sediments of the Upper Devonian/Lower Carboniferous series. Along the Whitfield road near Tolmie isolated patches of Older Basalt occur.

A visit to Powers Lookout on the King River, midway between Tolmie and Whitfield, was rewarded by an impressive outcrop of coarse conglomerate. This conglomerate is considered to be of Lower Carboniferous age, and is probably of estuarine origin, which would place it amongst the last deposits of the Tasman Geosyncline in central Victoria. The conglomerate is flat-lying and its strong jointing has enabled the formation of precipitous valley walls. Many of the constituent stones exceed two inches in diameter.

A considerable thickness of the conglomerate was found at Paradise Falls, on a western tributary of the King River, where it eventually overlies the northern segment of the Upper Devonian acid volcanics. The falls are about 200 feet in height, and the valley below has the same steep sides as that of the King River, and revealing a varied history of deposition of coarse conglomerate, fine conglomerate, gravel and sandstone at different heights and thicknesses.

Evidence of outcrops of the volcanic rock is seen in the fertile red loam of properties bordering the road at many places between Tolmie and Whitfield.

The assistance of club members in drawing attention to the location of various outcrops, and in their interpretation, and in the collection of specimens, is gratefully acknowledged.

BRUCE C. JONES

The Trap-Nest or Sand Ant

By HOWARD SLOANE AND ALEXANDER I. SLOANE

Among the most harmless creatures on Earth is the Trap Nest or Sand Ant, *Nystalomyrma* (previously *Aphaenogaster*) *longiceps* Smith, of Australia. It is an insect about two tenths of an inch in length without sting or other annoying characteristic. It is transparent, sandy tan in colour, and it matches well the habitat of granite sand in which it excavates its conspicuous holes.

It was common in certain areas in the Riverina especially at Savernake, 18 miles north of Yarrawonga, but the removal of the Native Pine forest, and the growth of grass, along with the trampling of stock, is reducing its numbers each year. Its home is on the sheltered east slope of the sand dunes where the sand is softer and the ants get the morning sun.

This ant is very persevering, withstanding the rigours of drought as well as the periods of cold in winter. It does not forage along tracks like the little black ant, and the meat ant, but wanders singly in search of food in the vicinity of its home. It depends on its trap-like hole for its food for it consumes whatever chances to tumble into its front door. The holes are usually about an inch in diameter and go straight down for eight inches. The sides are smooth and a cone of sand pellets surrounds the top. A favourite site is at the base of a Murray Pine, and many nests are grouped in such places, the sand from one entrance being inclined to fall into its neighbour.

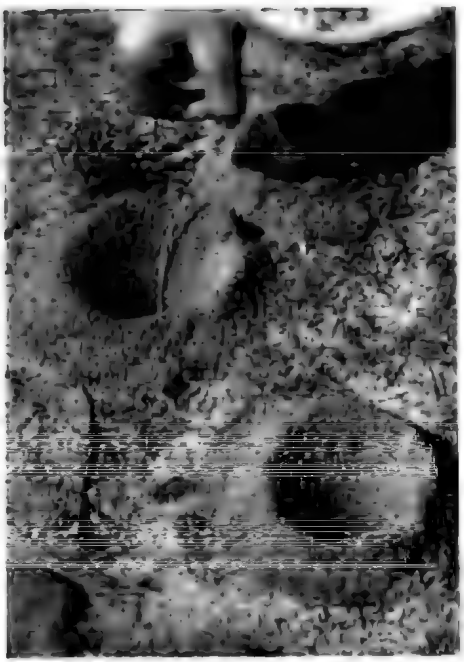


FIGURE 1—Sand Ant holes repaired after rain. Two ants are biting the stem of grass, showing the contrast between their size and that of their holes.

Photo: *A. I. Sloane.*

A sand hill some hours after a summer thunderstorm is a remarkable sight. The ants then clean out their nests, the darker coloured subsoil

FIGURE 2—Sand Ant holes repaired after rain, under Native Pines *Callitris*, Savernake, N.S.W., 1963.

Photo: *A. I. Sloane.*

rings being conspicuous. In thundery weather the winged males and females fly aloft, and when this is taking place there is great agitation and excitement at the entrance. The presence of the mating ants in the upper air attracts Swifts and Woodswallows, and at such times hundreds of these birds often fill the sky. These ants are a food factor in Nature's economy: they feed insectivorous birds providing them with moisture, which the ants in turn secure from other insects and from the soil in which they live. The reduction by man of the vast swarms which once filled earth and air tends to upset the balance of Nature by making life hard for some insectivorous birds which play no small part in controlling such pests as the grasshopper.

The ant-lion with its conical sand-trap is fond of the Sand Ant, and should one tumble into its hole it is pelted with the dislodged sand until rolling to the bottom it can be seized. The Trap-nest Ant uses a similar idea for obtaining food, any unfortunate insect falling down its pit-like hole being seized and eaten. If a stalk of grass is inserted into one of their holes, it is usually found to be grasped in the jaws of a number of clinging ants.

Our observations show that the entrances, or trap holes, are connected by horizontal passages, there being no

FIGURE 3—Cross-section of Sand Ant hole with grass inserted in horizontal passages. Pine roots below.

Photo: *A. I. Sloane.*

more than three leading from the bottom of each hole, situated at a depth varying from six to ten inches. The passages seldom go below the bottom of the conical entrance hole shown in the illustration.

A very interesting point is that only the worker ants have been observed in the holes inspected, no queens, nor larvae, nor associated insects, being seen. It would appear that the food storage, and nursery chambers must be concentrated in a central position, possibly at the base of a tree where the holes are usually very numerous. We may thus visualize the organized city with its numerous trap entrances in the care of their quota of foragers, and its heart to which food is transported below ground. No doubt there is united effort to repair the funnels after rain, and, since only about ten ants appear when an object is inserted down a hole, a limited number of guards is stationed at each entrance. These ants deserve further study and an inspection of their central home may reveal more secrets of Australia's native life. The species is found in all States and is nocturnal in habit.

Retirement of Mr. A. N. Burns

Alexander Noble Burns, Assistant Director of the National Museum of Victoria was born at Melbourne on June 20, 1899. He received his early education at Caulfield Grammar School and Swinburne Technical College.

His earliest association with entomology and the National Museum dates back to July, 1914, when as a lad of 15 years, he became acquainted with Mr. F. P. Spry, then Entomologist at the Museum. Spry encouraged the enthusiasm of this young lad and instructed him in the fundamentals of entomology and entomological collecting that were to stand Mr. Burns in good stead throughout his life, and lead to his associations with such famous entomologists as Dr. R. J. Tillyard, Dr. G. A. Waterhouse, Mr. W. W. Froggatt and Mr. T. G. Sloane.

From 1922/24 he was engaged on economic entomological problems with the Commonwealth Prickly Pear Board in Queensland, firstly under the direction of Professor Harvey Johnston and later with Mr. Alan Dodd. He then transferred to the Queensland Bureau of Sugar Experiment Stations, a section of the Department of Agriculture, where until 1930, at Brisbane and Mackay, he undertook research work in entomology under the direction of Mr. H. T. Easterby and Mr. Edmund Jarvis.

At this stage Mr. Burns realized the necessity of University training, and commenced, part time, studies at the University of Melbourne where he obtained his B.Sc. Later, about 1950, on submission of original papers dealing with his studies in Australian Entomology, he obtained his M.Sc. degree from Melbourne.

On completion of his B.Sc., he travelled overseas to further his studies, working at both the British Museum and the Royal Botanic Gardens, Kew. He was later admitted as a Fellow of the Linnean Society of London and the Royal Entomological Society of London.

Returning to Australia about 1941 and after some national service in Great Britain, he joined the Intelligence Corps of the Australian Army, being concerned chiefly with mapping, and became a Commissioned Officer in this Section.

In December 1944 he joined the staff of the National Museum as Entomologist (Temporary) at a time when the entomological collections were at a very low ebb. With great pains, he commenced the gigantic task of rehabilitating the col-

lections, a task which was most successfully accomplished as can be seen by the present state of the collections. In August 1946, he was appointed to the permanent staff as Entomologist, which position he occupied with distinction until 1959, when he was appointed Assistant Director.

Mr. Burns has always been an excellent field man, collecting extensively in all groups of Insects throughout Australia, particularly in Queensland and Victoria. His handling of such specimens has always been near to perfection, and together with his documentation of such material, has been the subject of most favourable commendation from all parts of the world. Not content with the collecting side only of entomology, he has, particularly over latter years, contributed greatly to the taxonomy of certain groups of Australian insects, notably the Butterflies (*Lepidoptera*) and the Cicadas (*Hemiptera*), in which groups he has published a number of papers both in Australia and overseas. His clarification and illustration of the life history of a number of Australian butterflies has been spectacular, and has contributed a great deal to solving certain taxonomic problems. He has also made a large private collection, beautifully housed, of insects, chiefly Australian and South American.

He has published an important book (in collaboration with C. Barrett) dealing with the *Butterflies of Australia and New Guinea*, and has, in manuscript form ready for publication, a book dealing with the *Butterflies of Victoria*, a publication which will be most valuable to collectors.

Mr. Burns' private interests have evolved along the lines of the glasshouse culture of orchids and indoor plants, in which hobby he has excelled.

His retirement from active entomological work on June 19, 1964, will cause a great gap in Australian entomology. This, however, will be partially filled by a small group of amateur collectors whom he has trained and encouraged over the years, in the same manner in which he was encouraged by the Museum entomologist half a century earlier.

Mr. Burns is one of the few Life Members of the Field Naturalists Club of Victoria and has been a member for over 45 years.

R. T. M. PESCOTT

Victoria Range Shelters

By Aldo Massola

The greatest known concentration of aboriginal paintings in Victoria is on the walls of the rock-shelters on the Cultivation Creek water-shed, in the Billywing area of the Victoria Range, Western Grampians.

Cultivation Creek (Billiminah Creek), rising from Mt. Thackeray, in the innermost chain of the Victoria Range, winds a tortuous and laborious course as it finds its way through a number of deep gullies, sometimes racing, torrent-like, over rocks and cascading over boulders, at other times almost arrested by a veritable embankment of tangled undergrowth and fallen timber; every now and then receiving new impulse from smaller affluents, which, descending from side gullies, help it to drain that part of the Victoria Range.

Eventually these tormented waters find temporary peace in the stillness of the swamp, the north part of which was know to the natives at Lootchook (Lo-tjark, reedy swamp) and the southern portion as Woohlpooer (Wol-poat, reflections of turtles on the water), extending for some three miles in a westerly direction, and about six miles north and south, on the flat country to the west of the ranges. Here Cultivation Creek loses its identity, as its waters mingle with those of other creeks, the most notable of which are Hut, Deep, Honeysuckle, Mosquito, Scouts, and Number One. The overflow from this swamp crosses the Henty Highway as Tea Tree Creek, on its westerly course to the newly-built Rocklands Reservoir. In the old days Tea Tree Creek helped to swell the Glenelg River.

To the aborigines Cultivation Creek must have been more important than the others, at least mythologically, for, with the exception of 'The Cave of Hands', the 'Drual' and the 'Billywing' shelters, which are on Deep Creek, all the known sites in the area are along its course. The bush-walker who attempts to follow the creek upstream soon gives up in despair, as almost impenetrable thickets of Swamp Tea-tree, sword grass, ferns, and other moisture-loving vegetation, present themselves in never ending series. It is best, therefore, to forsake the occasional glimpse of the rippling waters, and to attempt to follow the creek's course from along the higher ground.

However, another difficulty soon arises, for here are the huge boulders, the massive tors and deep crags, which, together with the trees and scrub, make deviations from a planned course necessary; the result is that often Cultivation Creek is lost and an affluent is followed instead. To make matters worse no accurate map of the area exists.

There is one advantage in walking nearer to the tops of the valleys: all the paintings, so far, have been discovered on the higher ground. There must be others awaiting discovery.

Up to the end of 1960 five sites had been located along the creek, or its affluents. Following the procedure established by Kenyon, Barrett and others, upon location each new shelter received a distinguishing name, generally of a descriptive nature.

The list stood as follows:

Name	Symbols	Colour	Date of Discovery	Recorded by
Red Rock	Human figures Kangaroos Emus Lizards Strokes	Red	S. Carter, 1859	J. Mathew, 1897 *Proc. Roy. Soc.* Vic. (N.S.) 9
Small Rock (In vicinity of last)	Human figure Strokes Bird Tracks Stencilled hand	Red	Muirhead and Carter, 1866	J. Mathew as above
Cave of Fishes	Human figure Lizards Herring-bone Strokes	Red Yellow	A. Matthews, April 1943	C. Barrett, 1943 Art of the Aust. Abo. Melb.
Unnamed	Bird tracks Kangaroo tracks	Red	W. Blucher I. R. McCann 1959	A. Massola 1960 *Vic. Nat.* 76.
Unnamed	Human figure	Red	I. R. McCann E. Puecker E. Barber C. Kroker N. A. Tudehope A. Massola 1959	A. Massola as above.

Since the end of 1960 nine other shelters have been located on Cultivation Creek. The finding of so many new sites in such a comparatively short time is due to two main causes. One is the making of new tracks by the Forestry Commission for the purpose of fire-fighting. Although rough and sometimes dangerous, these new tracks enable the searcher to drive part of the way, and therefore, come within reach of unexplored country. Secondly, and of extreme importance, was the gathering together from widely separated areas of a small band of energetic and experienced field naturalists who tirelessly crossed the wild ranges in every direction and were rewarded by the finding of many new shelters.

Because of this abundance of new shelters it was decided to abandon the use of names, and to number each new find in order of its discovery. The ultimate idea is to paint the number of each in a visible, and yet non-vandalic manner, for the information of other bush-walkers who might stumble upon them.

Bearing in mind that each should be prefixed by C.C. (Cultivation Creek), the list of the new shelters is as follows:

Name	Symbols	Colour	Date of Discovery
C.C. No. 1.	Human figures Lizards Herring-bone Two-headed arrow	Red	Brian Warren, Jan. 1962
C.C. No. 2.	Human figures Lizards Strokes	Red	as above

C.C. No. 3.	Human figure Bird tracks	Red	I. R. McCann Brian Warren A. C. Hemley Feb. 1962
C.C. No. 4.			
C.C. No. 5.	Human figures Lizards Bird tracks Male and female sexual organs Strokes Spear-head (?)	Red White	W. Blucher E. Tucker I. R. McCann A. Massola March 1962
C.C. No. 6.	Lizards	Red	E. Barber C. Kroker
C.C. No. 7.	Human figure Human figures Lizards	Red White	E. Tucker, May 1963
C.C. No. 8.		Red	
C.C. No. 9.	Lizards	Red	E. Tucker, 1963

By this list it is evident that many of the symbols re-occur in each shelter, and that the 'Lizards' predominate. As they do in the three shelters along Deep Creek:

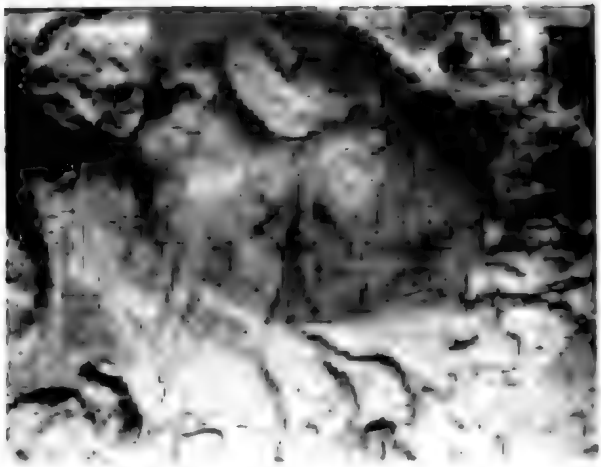
Name	Symbols	Colour	Date of Discovery	Recorded by
Cave of Hands	Stencilled hands Human figures Lizards Strokes	Red		A. S. Kenyon, 1929 "Art. Aust. Abo" in Aust. Abo. Art. (Nat. Mus.)
Billywing Shelter	Lizards	Red	J. H. Clarke, Dec. 1957	A. Massola 1958 *Vic. Nat.* **75.**
Drual Shelter	Human figures Lizards	Red	I. R. McCann C. O. Kroker D. Littlewood	
	Bird Tracks	White	P. Cummings M. Richmond C. Toban A. Massola Feb. 1958	A. Massola as above

Similar symbols appear in the shelter on the extreme north of the Victoria Range, over a mile from the Cave of Fishes:

The Camp of the Emu's Foot	Lizards Herring Bone Broad arrows Barred circle	Red	E. Tucker Feb. 1960	A. Massola 1960 *Vict. Nat.* **77.**

The similarity persists in the Black Range Shelter No. 1, 12 miles west of the Camp of the Emu's Foot.

B.R. No. 1.	Human figure Lizard	Red	I. R. McCann E. Tucker L. K. M. Elmore K. M. Walker A. Massola 1962	A. Massola 1963 *Vict. Nat.* **79.**



Human figure.
Shelter No. 5.

In nearly all these shelters the symbols are so similar that it is apparent that they form part of one tradition, and that they are the work of artists of the one school, if not of the one artist.

There are, however, two shelters which show peculiarities, differentiating them from the rest, and from each other, although retaining similarities that connect them to all the others. One is "Red Rock" and the other Cultivation Creek Shelter No. 5.

In the Red Rock shelter the artist has painted a hunting scene, and has attempted "landscaping", a technique unknown from any other shelter in Victoria. Further the kangaroos and the emus, which form the subject of the hunt, are rendered in full instead of showing only their tracks, as was done in all the other sites.

Shelter No. 5. differs from the others because a male and two female sexual organs are depicted on the walls. For this purpose the artist has availed himself of peculiarities of the rock-surface. The male symbol is adapted from a natural protuberance jutting out of the wall surface. The two female symbols are two relatively deep, circular depressions. These are all natural features and not man-made. The protuberance has been stained all over, and the two cavities have been "edged" with red ochre. The three are thereby strongly emphasized and brought to the notice of the onlooker. They probably represent the cult hero and his two wives.

The difference between the adaption of these natural formations to this purpose, and, the actual carving of these symbols in the relatively soft sandstone is so slight, that it is a wonder that rock-carvings have not yet been found in the Grampians. One is reminded of the fact that the baked clay lumps found in camp ovens in stoneless country are potential prototypes of pottery, yet the natives had no pottery.

There is no doubt in my mind that these two shelters, thus differentiated, were prominent 'stations' in the mythologies of the Lizard Totem.

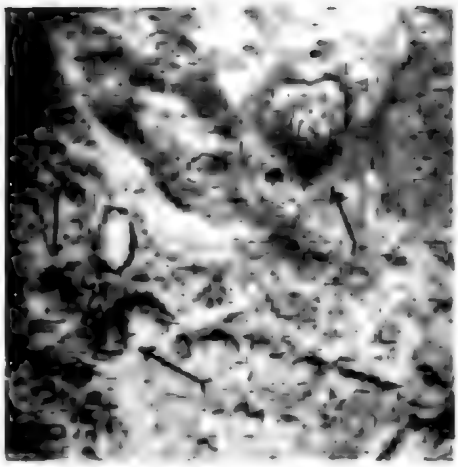
It is likely that the custom of painting totemic symbols was a recent introduction. Except for two localities in the north-east of the State, and for one solitary example in the Pyrenees, all the paintings so far discovered in Victoria are to the North and the West of the Grampians. Further, most

of the designs are similar to those found in eastern South Australia and in western New South Wales. It is, therefore, reasonable to assume that the art came into Victoria by diffusion from that quarter. Certainly, it had to cross the mallee and other desert country where there are no paintings, but neither are there any shelters or rock walls on which to paint.

It is impossible, at this stage, to date these paintings. Since in the Grampians they are only found in a restricted area, it could be argued that they were of too recent introduction to be adopted by all neighbouring tribes. On the other hand, at some of the sites there are indications of the superimposition of one style upon the other. If a new style were already superseding an earlier one, then this could point to some greater age for the earlier. The only explanation one can offer for this apparent localization of the paintings is that the tribes of the North and West were in a constant state of war with the tribes of the East and South, and that, consequently, no interchanges of a sacred nature were possible between them, although the little we know of both their material culture and their tribal institutions show they were not dissimilar.

In the Western Grampians paintings are located on the walls of some of the shelters eroded by the elements into the sides of the mountains and underneath the overhangs of some of the detached tors.

They appear to form groups, each example of the one group bearing paintings of a related nature, both in style and form. Thus, there are human figures and stencilled hands in one, hands and bird-tracks in another, bird tracks and human figures in a third. It is, therefore, reasonable to assume that each shelter of each group was a "station" in a myth, ex-



Sex organs. Shelter No. 5

plaining the activities of a certain cult hero or totemic ancestor: here he ate some food, there he created certain creatures or magic objects. The several groups exhibit different symbols and art-styles, and are obviously the work of separate artists. They are, therefore, separate totem centres.

The purpose of these totem centres was twofold; firstly, to ensure the continued existence of the animal symbolic of the totem and, secondly, as a visual proof of the past existence of the Ancestor and of his activities while he was on earth. This latter was mainly for the benefit of the newly initiated members of the totem, who would see in the symbols painted in the shelters a link between themselves and the "Dreamtime".

As distinct from the link thus connecting the past to the present, (that is, as distinct from the Totem Spirit, lurking in the totem centre, be it rock shelter, water-hole or tree, intent on entering the womb of any woman who may pass by, in order to give rise to a new totem member) the continuity of the totemic animal was of economic importance. Generally, members of a totem did not eat their totem animal,

although non-members were at liberty to do so. Consequently, members of one totem performed ceremonies which were destined to provide new members for their own and food for all other totems.

In the Western Grampians painted shelters are very difficult to locate, because, as well as the difficult terrain, one has to contend with the tangled mass of vegetation which successfully hides even large rock-masses. In the old days this barrier did not exist, as the natives were in the habit of periodically setting fire to the bush in order to facilitate hunting.

These fires, as well as clearing the country, would also encourage the growth of tender grasses, which, in turn, would attract more game for the aborigines to hunt. The rock paintings would, therefore, have been much more accessible than they are today, although possibly only reached by them after a long walk and much climbing, away from their camping places and the uninitiated.

With the exception of the paintings at the Red Rock, aboriginal art in the Grampians is symbolic. An emu or a kangaroo is only represented by its tracks. This symbolism is carried beyond our comprehension when ceremonial objects are represented. They take the form of geometric designs rendered in a manner reminiscent of "child art" and a great deal of imagination is necessary in even guessing what they may mean. It is to be remembered that they were primarily executed in this manner in order to mystify any uninitiated aborigine who may have stumbled upon them.

It is not a guess that they were meant to tell a story. Unfortunately, we are so ignorant of aboriginal mythologies, that even if we identify the object represented by the design we still cannot follow its meaning. At the best we can assume that the cult hero or ancestral being was a Lizard- or an Emu- or a Kangaroo-man by the prevalence of this symbol in any one group of shelters.

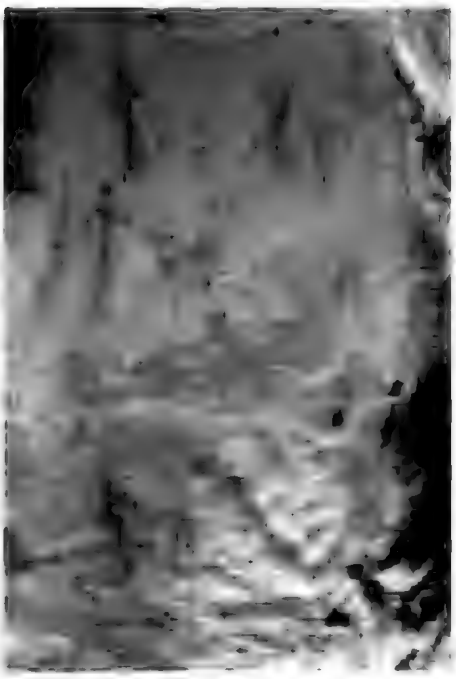
With the exception of one site (the Red Rock) the designs in these shelters are primitive in execution, and generally appear to have been made by non-artists, and in a careless manner. In every tribe each man decorated his own utensils and weapons, but often some individual became recognized as an artist and his services were then much sought after. This, however, did not apply to the rendering of the sacred designs, this being the sole right of the Elders of each totem. As they were generally old men and not necessarily artists, this explains the difficulty of differentiating between the figure of a man and of a lizard, between a bird track and a ceremonial object.

The paint was made by crushing earth pigments, red and yellow ochres and white pipe-clay, and mixing them with fats obtained from goanna or emu. They were applied with the fingers or with a stick with chewed ends. The "hands" were either stamped or stencilled. For the latter process mouthfuls of the "paint" mixed with water, were spurted over the outstretched hand held against the rock surface. When the hand was removed the space of rock-wall which had been covered by it was left clear, while the outline of the hand would be coloured, the result being a real stencil. These "hands" are common in rock art all over Australia. Various reasons for them have been advanced, some suggesting that they were meant to be a visible sign to all who followed that the owner of the hand had visited the sacred places. It is true that aborigines easily recognize hand-marks and footprints as belonging to a particular individual, but I would rather think that these shelters were not pilgrimage

centres, this idea being foreign to our aborigines. Sacred places were only visited for specific purposes, such as during initiation and totem-animal increase ceremonies. Nor can we assume that the stamping of the hands on the walls of the shelters was the equivalent of an assertion of belief on the part of the attendants during the ceremonies. Far too few of these hands were stamped for the number of people we presume to have been initiated over the centuries.

These hands were the imprints supposedly left by the Ancestor. The mark of one solitary hand against a rock-wall probably marks the spot where, in a myth, the Ancestor steadied himself, or else were put there by him as a direction sign to the more hidden shelters, as are the solitary footprints engraved in the Hawkesbury sand-stone of New South Wales.

In some of the shelters certain parts of the rock-surface, either on the walls or on protruding floor-rocks, have been polished. This was not done with an abrasive instrument, such as a piece of sand-stone, but by continual rubbing by the human hand. These rubbings are possibly the equivalent of similar actions in other religions. By rubbing the hands on the supposed relic of totem Ancestor or Saint, and then rubbing one's own body, some of the power, or "mana" present in the relic is transferred to one's self. The smoothness of the rock surface, indicative of many rubbings by many men over a long period of time, is at variance, and contrasts sharply with the relative paucity of painted symbols in the same shelters. It would thus seem that only a very limited number of symbols were necessary to tell the particular part of the myth which pertained to any one shelter. In keeping with what we know of aboriginal mythologies these episodes



Lizards. Shelter No. 8.

were probably very simple, and yet one suspects that the number and form of the symbols was traditionally limited. If this were not so, every possible shelter should be crowded with a great variety of motifs, as is the case in some localities of western New South Wales, and every available wall should be covered with "hands" stamped upon it by the innumerable aborigines who must have visited these mountains over the centuries.

There remains one symbol to discuss—the "stroke". This is, as the name suggests, a single, perpendicular line, up to four or five inches in length. It is not a very common motif either in the Northern or in the Western Grampians. At the Red Rock, however, it occurs in such numbers that it has been described as representing long grass or reeds. It does in

fact appear to form part of the "hunting scene" depicted on the rock. This landscaping is, of course, foreign to aboriginal art and the interpretation of both the "grass" and of the "man climbing a tree" from the same shelter, should be accepted with caution. The Red Rock is altogether remarkable and unlike any other site in the vicinity, because of the great freedom of movement and wealth of action of the figures, as well as because actual animals are depicted and not just their tracks.

In a Northern Grampians example the strokes do not form part of a composition and, being the only element in the shelter, cannot be referred to as "grass". When I first described the shelter I suggested that the motif might represent "days". It was customary for the aborigines to leave a stick stuck in the ground at their newly vacated camp when moving to a new locality. The stick was inclined to point in the direction taken by the moving camp and any group desirous of joining it would thus be able to know in what direction to proceed. But this was not enough, as many recognized camping places could be located in that direction. To dispel any doubts strokes were scratched on the ground close to the stick, thus two strokes signified a camp two days away. However, I now believe that the "strokes" painted in the shelters represent "Churinga" or sacred wooden sticks, so they could have a ceremonial meaning after all; which goes to show how careful one must be when dealing with aboriginal art motifs.

Australian Wattles—No. 43

Three Nerved Wattle, *Acacia trineura,* and Mitta Wattle, *A. dawsonii.*

By JEAN GALBRAITH

Three-nerved Wattle is a rather stiff and solid dull green bushy shrub of the Mallee and drier parts of the Wimmera. The plant carries the means of recognition in its name, for the straight, usually upward pointing phyllodes are marked by three long nerves with fainter branching veins between them.

The phyllodes are 1-2 inches long, broader toward the end and occasionally slightly curved. Very occasionally the phyllodes point downwards.

It is in full bloom in October, and the relatively long stalked dark-yellow flower-heads are in clusters of about six, or less; each cluster on a short stem at the leaf-base.

Dark narrow pods, about 2 inches long, ripen, in summer. They are almost cylindrical except for a slight narrowing between the oval brown seeds.

Acacia dawsonii occurs in a small area of north-eastern Victoria, on the Mitta River, but it is more common in New South Wales. The Mitta Wattle has much narrower phyllodes than *A. trineura*. These are up to 4 inches long and are narrowed to a blunt apex. Moreover, these phyllodes have several long nerves, not three.

It is quite distinctive too, because the tiny flower-heads are stalkless, arising from short stems in the leaf axils. Thus the effect is of interrupted stiff catkins although the "flowers" are formed of tiny clusters, not single flowers as in a true spike, as for instance, in the Narrow-leaf Wattle *A. mucronata*.

Bush Brushes

The fox's brush was the traditional trophy of the chase. The Field Naturalist usually returns from an excursion into the bush with a different sort of "tale". If you have one worth mounting and preserving send it to the Assistant Editor, "Victorian Naturalist", 102 Murray Road, East Preston, N.18, Victoria.

Babblers and Choughs

Mr. A. H. Chisholm writes from Sydney on the subject of two ground-frequenting birds:

As readers of the *Vict. Nat.* will know, the "word of warning" given by Mr. Roy Wheeler (in August), regarding the decline of the Grey-crowned Babbler in Victoria, had previously been expressed by myself (April) and Mr. Noel Learmonth (July).

What we now need, rather than further emphasis on the falling-away, is some indication of the cause; but, apart from my guess that forest clearances and an upsurge of predators may have been factors, the reason for the disappearance of this hearty bird still remains obscure. Certainly, the happening is very regrettable.

In Mr. Wheeler's article reference is made also to activities by White-winged Choughs among dust and cracks on bare ground, and it is asked whether anyone can throw light on what appears to be a habit. In fact, however, "light-throwing" on this subject has already been accomplished.

Writing in *The Emu* in 1957 (vol. 57, p. 290), from Finley, N.S.W., John Hobbs reported having seen 18 choughs at a spot where they had dug six small holes in the ground, filling their beaks with fine dust, and placing it among their feathers. Later, in a letter to me, Hobbs referred again to what he said was a frequent practice by Choughs of using special "dusting-sites" and putting dust among their feathers, and he suggested that the procedure was, in some degree, the equivalent of anting.

Accordingly, I included these enlightening observations in "The History of Anting" (*Emu*, 59/114 and 129, 1959). It is quite clear that Choughs practise dust-bathing as keenly as some other birds practise anting. Babblers, too, are resolute dust-bathers (I have seen them in action), but they do not appear to be, like the Choughs, diggers of holes.

It would be interesting to know more about the habits of the Grey-crowned Babbler. Some birds that nest in colonies congregate each year at the same spot to build their nests and rear their young. Some heronries in England have been in regular use by *Ardea cinerea* for hundreds of years and banding has shown that the migrant European Swallow, *Hirundo rustica*, returns often to nest in the same barn after a journey of thousands of miles. However there are other birds like the Wattled Starling, *Creatophora carunculata*, of Africa which, although not in such large flocks through most of the year, collects in hundreds to nest in one small patch of bush and may never use that patch again. Although this bird is not uncommon in Kenya and presumably nests somewhere every year, the writer during many years' residence only heard of one nesting occurrence, in a group of whistling thorn (*Acacia* sp.) on a Laikipia plain in 1945.

Between the two extremes, a site used for centuries and a site chosen

for one occasion only, there may be a range of breeding habits. Obviously human activities interfere with the environment and there must be many parts of Victoria which the Grey-crowned Babbler would not now select for nesting. On the other hand a colony was feeding young in nests in bushes along a metalled road some miles from Creswick in January 1960. If the species is so susceptible to human interference, why did this colony pick those bushes alongside a road frequented by cars and lorries? What information is available on the continued use by this species of one site for nesting over a number of years when undisturbed?

Many readers doubtless have the answer to this question.

J. R. H.

Book Review:

"Australan Honeyeaters"

By Brigadier Hugh R. Officer

Published by The Bird Observers Club, Melbourne, 1964. 83 pages, 12 coloured plates by Peg Maliby, map by Alex Stirling, obtainable from the Hon. Secretary, The Bird Observers Club. 59a Upton Road, Windsor, S.1, Victoria, 16/- (posted 19/-).

Somewhat later than originally predicted, Brigadier Officer's eagerly awaited *Australian Honeyeaters* has appeared.

In it the sixty-nine species of the family Meliphagidae are described, about a page of text being allotted to each. In each monograph, after the description, there is a short "Field Identification" and then follow paragraphs headed "Distribution", "Habits and Voice", "Nesting Habits" and "General". In the last differentiation from similar species is often discussed. Probably no-one was better qualified than the Brigadier to draft these monographs and an excellent job he has done. Clarity and conciseness have not excluded an occasional tinge of humour. The only suggestion offered is that it would have been helpful to anyone trying to identify a bird had a reference to the plate in which the species was figured been given at the beginning of each monograph.

Peg Maliby's plates are generally very satisfactory. No difficulty was found in picking out the sixteen species with which the reviewer is best acquainted. However, the picture of the Singing Honeyeater, Plate VII, Fig. 4, does not fit the description given on page 43-44 (or in other works) and on several plates the relative sizes of the individual species illustrated are not in accord with their measurements. No-one would imagine from Plate IX that the Regent was in life considerably larger than the Yellow-faced. Most bird-watchers use size as one of the features to note in attempting to identify an unknown bird, and although incorrect impressions of the size of birds seen in the bush are frequent, it would have been better had all the species in one plate been drawn to the same scale.

The printer has done his work well. The paper is good and the general appearance of the book is most attractive. Bird-lovers will all applaud the action of the M. A. Ingram Trust in making the publication of so useful a book possible at so low a price.

J. R. Hudson.

Addendum. Since the typesetting of this review the B.O.C. has issued an Errata sheet correcting the numbering of three of the figures on plate VII. Fig. 4 represents in fact the Mangrove and not the Singing Honeyeater.

Things to see under the F.N.C.V. Microscope

By Jean Galbraith

This morning I gathered a handful of this and that from the garden (all native species) and spent half an hour looking at them under the microscope. Here is what I saw:

A single bell of Red Heath *Epacris impressa* with its fringed calyx, and the ring of impressions responsible for its name, like dimples between the sepals.

Achenes of New Holland Daisy *Vittadinia*, each crowned with a bowl of curved hairs, almost touching and minutely barbed.

A leaf of Shiny Cassinia, loosely webbed with a mesh of hairs underneath, on either side of the smooth midrib.

The fruit of Pennywort *Hydrocotyle* or Raspwort *Haloragis* curiously ribbed and patterned, but different in every species.

The stamens of Guinea-flower *Hibbertia*, like so many bilobed golden eggs, clustered round the slim green style in some species, and all on one side of it in others.

A bud of Incense Wattle *Acacia leprosa* with its pointed bracts rising from a forest of curled white hairs.

One flower of any Paper-bark *Melaleuca* with its stamens bundled like brushes in some species, like fans, or trees, or feathers in others.

A leaf of Woodruff *Asperula scoparia* or *A. conferta* like a spear tipped with glass.

The delicate tissue edged scales on a bud of Scaly Phebalium.

A *Centrolepis* flower, white or crimson between its two horned bracts, as lovely under magnification as an orchid to the naked eye.

The heart of a Wild Violet *Viola hederacea* flower, where two of the mauve petals are frosted with white papillae and the base of the purple style is sheathed in old gold.

The seed-like fruits (achenes) of a wild daisy, *Brachycome*, each species with its own design; some winged, some bearded, some with a mere stubble of hairs; some brown, others straw-coloured or black.

The back of a daisy-bush *Olearia* leaf, felted with a tangle of hairs in some species; with T-shaped or stellate (star-shaped) hairs in others.

The centre of a newly opened Wax-flower *Eriostemon*; its stamens forming an alabaster vase round the style.

Stamens of *Crowea* with their "kitten-tail" appendages.

Clusters of stellate hairs scattered over the back of a *Crowea* leaf, or the red part of a *Correa* bell (red form of *C. reflexa*) with its crystal balls set with ruby spears.

The fruiting fronds of ferns—Pouched Coral-fern with its spores in pockets; Scrambling Coral-fern with its spores uncovered; Maidenhair with its indusium (cover of the spore cases) like a lid; tufty sori (spore clusters) on the veins of Soft Tree-fern; the stalked, ripe spore clusters on the edge of a bracken frond, and so on through more variety than one can mention.

Caladenia clavigera, Plain-lip Spider Orchid

By J. M. and W. H. KING

This orchid is sometimes called either the Clubbed or Small Spider Orchid and is one of about twenty-two species of *Caladenia* found in Victoria.

Throughout the genus, the dorsal sepal is erect, incurved over the column. The lateral sepals are nearly equal to it in length, but flat, spreading or reflexed. The labellum or tongue is often fringed or toothed and has prominent glands.

In *C. clavigera*, the labellum has no fringe, whereas the closely similar *C. ciliatata* has a very definite fringe.

Flowers are usually solitary and borne on a hairy stem up to 12 inches in height. The flower is a greenish yellow with strong red-brown markings on the sepals, the front edge of the labellum being deep red or purple. The lanceolate leaf is hairy and although in many specimens the sepals are clubbed, this is a variable characteristic and in the orchid illustrated this feature is not present.

The Plain-lip Spider Orchid flowers in the spring and is widely distributed through central and southern Victoria although it is not particularly common. The two-headed specimen in the illustration was photographed near Warrandyte. In this locality, we have found only scattered single plants, but in the East Ringwood area and on the Black Range near Balmoral we have found them growing more abundantly. In September 1962, the species was found growing in very large numbers on freshly burnt country in the Jimmy's Creek area of the Grampians.

It should be noted that the formerly separate species *C. cordiformis* is now recognized as *C. clavigera.*

Caladenia clavigera.
Photo: *J. M. King.*

Field Naturalists Club of Victoria

General Meeting—September 14, 1964

In welcoming members the President, Mr. M. K. Houghton expressed his pleasure of having at the meeting a Country Member, Mr. D. N. Home, from Queensland.

The President announced with regret the recent deaths of two old members of the Club, Mr. John Meade and Mrs Dave Lewis. Mr. Meade had recently, until failing health had caused him to relinquish the post, been Assistant Librarian. He had attended meetings regularly, had frequently participated in excursions, and had been known to many members. At the President's invitation, Mr. E. S. Hanks spoke of Mrs. Lewis. Known to the majority of Melbourne members, Ruby Lewis had, until recently, rarely missed a monthly General Meeting. She had joined the Club with her husband, Dave, about 20 years ago and, until his death, they had both been very active members. Mrs. Lewis had continued to take a great interest in the Club's activities and had joined with others in the organized excursions, even those of longer duration. She would be mourned by the many friends that she had made in the Club.

The President congratulated the Chairman of the Nature Show Committee, Mr. D. E. McInnes, and the many willing workers on the fine presentation at the 1964 Nature Show. The result reflected great credit not only on our members, but also on those of the Society for Growing Australian Plants. The total attendance had been 6201 as against the total of 4603 for the 1963 Show. Members present showed their agreement with the President's appreciation by applause.

The Secretary, Mr. E. H. Coghill, announced that he had applied to the Town Hall for the dates September 6-8 for the 1965 Show and mentioned that two syllabus of lectures by the Council for Adult Education had been tabled so that members could consult them. Mr. Coghill said that members present would have noticed that Miss Chisholm had taken on the duties of Assistant Secretary; he was surprised that no-one living nearer had not volunteered to do this work for the Club.

There were two "Subjects for the Evening".

Miss M. Lester gave a most interesting talk on "Ferns". Dealing with a number of the conspicuous ferns of the Dandenong Ranges she explained the significance of the sori in the identification of the different species and illustrated the different types of fronds and sori with a series of very well-chosen transparencies. A particularly beautiful slide was one displaying a cross-section of a tree-fern trunk. A short account was also given of the alternation of generations in the life cycle of ferns.

Mr. E. Byrne spoke on "Soil Conservation at Eppalock". He said that the Heathcote area was first occupied by pastoralists about 1838-1840. As a result of the old system of sheep-husbandry and later, around 1852, the activities of gold-miners, a serious erosion problem had arisen in what was now the catchment area around the Eppalock Reservoir, sited at the junction of the Campaspe and Coliban rivers. Of the area of 820 square miles, about 200 square miles were affected with severe sheet or gully erosion. The State Conservation Authority was about half-way through a 10-year programme to stop this erosion and was receiving excellent co-operation from the Shire Council, landowners and other bodies. Mr. Byrne showed a Department of Agriculture film illustrating the work being undertaken and then spoke to a number of colour-slides indicating the methods employed and the great improvement already made in many areas.

The President, on behalf of members, thanked Miss Lester and Mr. Byrne for their interesting talks.

The new members listed on page 155 of the September *Naturalist* were elected on the motion of Mr. Coghill, seconded by Mr. Fairhall.

Under the item "General Business", Mr. W. Woollard mentioned that the Hawthorn Juniors had recently celebrated their 21st birthday. He urged Club members to attend the monthly meetings of the Junior Club from time to time to enjoy the enthusiastic way in which the meetings were conducted. He also stressed the need to start similar groups in other

suburbs. Miss Chisholm supported Mr. Woollard.

Mr. J. Baines mentioned that sales of publications at the recent Nature Show had exceeded £200 in value. 54 copies of *Australian Honeyeaters* had been sold. Mr. Baines brought to notice a new book, *Growing Australian Plants* by Lothian and Halliday, which he felt would be of interest to many members.

Miss Chisholm drew attention to a photograph of a number of dead Wedge-tailed Eagles hanging on a fence which had appeared recently in a Melbourne newspaper and to the subsequent correspondence on the eating of lambs by these birds. Mrs. Woollard said that her brother supported the view of the writers who held that eagles only ate lambs that were already dead. Mr. H. Stewart pointed out that the Bird Observers Club and the Fisheries and Wildlife Department were enquiring into the habits of the Wedgetailed Eagle. There was little doubt that these birds preferred to eat rabbits to lambs. It was difficult to prove to country folk that eagles were not really harmful. Mrs. Lee referred to another newspaper letter reporting losses of eagles from taking poison in an area where they were not shot.

There were a number of interesting exhibits on the table. There were pressed specimens of ferns and typical sori were shown under F.N.C.V. microscopes. Mr. J. Ros Garnet spoke to a number of specimens that he had brought. These included tertiary fossils from a raised beach at Port MacDonnell (Discovery Bay), fossil shells from coastal dunes at Beachport and volcanic bombs and tuff from a quarry near Mt. Eccles National Park. He had also a number of roadside flowers from near the coast in the region of the South Australia-Victoria border. These included *Darwinia micropetala*, *Logania ovata*, *Leucopogon costatus*, *Opercularia turpis* and *Pimelea spathulata*. Another interesting exhibit was a growing specimen of the Streaked Rock Orchid, *Dendrobium striolatum*, that had been in a pot for 25 years. Starting from a small slip, the flowering specimen now filled the pot.

Mr. E. Francis displayed some minerals from Heathcote; chert, jasper with quartz inclusions, selwynite, etc. Miss M. Elder showed some fine shells from the Barrier Reef.

Geology Group—September 2, 1964

Thirty-seven members and visitors were present, with Mr. L. Angior in the chair.

The secretary congratulated Master R. Whatmough upon winning a £50 bursary for his project on the Geology of Cheltenham. The award was made at the recent Science Exhibition. Arrangements were made for an excursion to Coimadai, on September 13, to examine glacial deposits and dolomitic limestone.

The subject for the evening was a lecture by Mr. D. S. Carruthers on "Iron Ore Deposits in the Hamersley Ranges in Relation to the Pre-Cambrian Geology". The speaker first discussed the various geological eras, concentrating on the Pre-Cambrian as being most relevant to the subject. This carried the time scale back in the region of 4,000,000,000 years, to the very beginnings of geological time.

Most Pre-Cambrian deposits have been destroyed or altered, which makes their study difficult. These deposits form what are known as "shields", and are often found to be the centre or base of many of the present continents. These "shields" when studied in various parts of the world are generally very similar in rock formation.

West Australia is built up mostly of this "shield" with the rest of the continent flanking it to the east. The oldest part of the Pre-Cambrian is known as Archean, and in West Australia is composed of gneisses and volcanic rocks which are highly crystalline. The gneisses were formerly sediments, and with the volcanics were deeply buried for millions of years when heating and re-crystallization took place. These hard rocks make up the "shield" area, and when uplifted and eroded form the Proterozoic, which is represented by the Nullagine system in West Australia. These are on the top or flanks of the Archean, forming conglomerates and sandstones of great thickness.

A point of interest is that diamonds have been recovered from the Nullagine, and were probably eroded from the Archean.

Following upon the Nullagine are basalt flows and then sedimentary formations, containing iron in well-banded siliceous rocks. Iron is a common mineral throughout the world, but not always in sufficient quantity to be commercially

exploited. The Hamersley Ranges deposits contain 20-30% iron, which is well worth mining. The beds are not highly metamorphosed as they have never been sunken deeply into the earth's crust. They were originally sea sediments which accumulated slowly, then were elevated some three to four thousand feet with dips of 30 degrees.

During the Tertiary period a hot and humid climate existed over the area, which was reduced almost to a peneplain. This brought chemical action into play with laterization of the deposits, leaching out silica and alumina, thus concentrating the iron in sheets. The speaker then showed slides illustrating the laterite levels which contain 65% hematite.

A description of the various types of iron ores and their exploitation was given. The iron deposits in this area form the largest economically important mineral discovery so far made in Australia. Current estimates place the extent of the lode at 24 million tons of high grade ore and additional 10,000 million tons of lower grade ore.

Photographs were shown of impressions in the formations which may prove to be algal growths or casts, but which have not yet been positively identified. Mr. Carruthers was thanked for his highly interesting and informative talk.

Exhibits: Aeolianite in various forms from Wilson's Promontory (Mr. B. Jones); Marble from Ankara, Turkey (Mr. L. Angior *per* Mr. L. Bairstow); Conglomerate and fossil wood, cut and polished (Mr. D. Dangerfield).

Botany Group—September 10, 1964

Eighteen members attended the meeting which was chaired by Mr. B. Fuhrer.

The speaker for the evening was Miss K. E. Hall who spoke on "Liverworts". Within the plant kingdom, the Liverworts (hepatics) are bracketed with mosses under the *Bryophyta*.

The name "liverwort" is thought to derive from two sources. Firstly, some were similar in appearance to liver, and secondly, in mediaeval times they were used to treat diseases of the liver. The "-wort" part simply means plant.

Several colour slides were shown and specimens were distributed for members to examine under lenses while Miss Hall described interesting points. Miss Hall recommended several books to be read on the subject and expressed the hope that her talk might stimulate members to search for the large number of liverworts to be found in Sherbrooke Forest.

Excursions to the Dandenongs, on October 11, and to the Blackwood area, on November 8, were planned. All club members are welcome to attend these functions.

PHOTOFLORA '65.

In February and March 1965 the Native Plants Preservation Society of Victoria will hold its third annual photographic competition for colour slides of Victorian wildflowers in the places where they grow. Take your photographs now. Entry forms available from the Competition Secretary, Miss B. C. Terrell, 24 Seymour Avenue, Armadale, S.E.3.

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2/6

Magnificent stand of White Mountain Ash, *Eucalyptus regnans*, in the Marysville State Forest

FORESTS COMMISSION VICTORIA

. . . . . *preserving the beauty of our forests for your enjoyment.*

Vol. 81, No. 7

F.N.C.V.

November 5, 1964

The Victorian Naturalist

Editor: J. R. HUDSON, B.Sc., M.R.C.V.S.

Assistant Editor: R. H. J. MCQUEEN, B.Sc., Dip.Ed.

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Latest Two Recipients of the Australian Natural History Medallion

By J. H. WILLIS

Members of the F.N.C.V. are surely gratified by the fact that two of their number have been awarded the Australian Natural History Medallion for the years 1962 and 1963. It is also fitting that this pleasure should be recorded by brief references to the distinguished work of both naturalists, whose interests cover a very wide field and whose influence, through their respective educational authorities, has been outstanding.

THISTLE YOLETTE STEAD (*née* HARRIS) is a native of Sydney and still resides there, close to the glorious Hawkesbury sandstone flora that she has loved so long and so intensely. She was educated at Mosman Public School and "Redlands" (Neutral Bay), then took her Bachelor of Science degree at the University of Sydney (1923); in 1924 she achieved the Diploma of Education (Sydney) and later Master of Education (Melbourne). From a secondary school teacher in biology with the Education Department of New South Wales, Miss Harris became lecturer in Biological Science and Natural Science Method at the Sydney Teachers' College, also a part-time tutor at Sydney Technical College. Her early teacher in languages, mathematics and botany had been Constance M. Le Plastrier who also introduced her to the Naturalists' Society of N.S.W. and helped to stimulate a lifelong interest.

FIGURE 1—Mrs. Thistle Y. Stead, of Sydney, Australian Natural History Medallioniste for 1963.

Lecturing on a wide range of subjects (botany, geology, entomology and general nature study), her great theme has been "preservation"—the urgent need to save and protect Australia's unique but dwindling wildlife, plant and animal. For almost 40 years an active member of the Wild Life Preservation Society of Australia, she has been Honorary Secretary for many years, President twice (1949-50, 1951-52) and has edited the Society's magazine *Australian Wild Life* since 1958. In the 1934-36 numbers she had published a series of illustrated articles on "Native Plants of N.S.W." (featuring species of the genera *Blandfordia*, *Eriostemon* and *Ceratopetalum*). She also edited the *Junior Tree Warden*, 1934 until 1960, and is at present editing a series of *Nature Books for Primary Grades* (Longmans Green & Co.)—the first six to appear by the end of 1964.

On 30 June 1951 Miss Harris married an old colleague and friend, the late Mr. David G. Stead—noted biologist, naturalist, conservationist and author in Sydney. Recently his memory has been honoured by formation of the David G. Stead Memorial Wildlife Research Foundation of Australia and its associate quarterly publication, *Wildlife Research News*.

Mrs. Stead is a member of the parent natural history societies in three States (N.S.W., W.A. and Vic.), election to the F.N.C.V. being in June 1945. Besides extensive travelling in and beyond her own State (N.S.W.), she has written innumerable articles in departmental and natural history journals. Her books deal chiefly with plant-life and appear under her maiden name, Thistle Harris; they are as follows:

Wild Flowers of Australia (1938)
The Arbor Day Book (1940)—edited
Nature Problems (1945)

FIGURE 2—Mr. Norman A. Wakefield (left) receives the Australian Natural History Medallion for 1962 from Mr. A. Dunbavin Butcher (Director of Fisheries and Wildlife Department, Vic.) at the Melbourne Herbarium, 14 Oct. 1963.
—*Photo.*: *Bruce Fuhrer*

Handbook of Nature Study for Teachers (1945)
Wildflowers of Australia—new and larger edition (1947)
Australian Plants for the Garden (1953)
Teaching of Nature Study (1954)
Naturecraft in Australia (1956)—edited and arranged
Eastern Australian Wild Flowers (1962)

Only once before has the Natural History Medallion been awarded to a woman, the late Mrs. Edith Coleman being the recipient for 1949. That record of service has been worthily upheld by Mrs. Stead who receives the 1963 Medallion. Congratulations are extended to her for a fine effort in fostering knowledge and appreciation of our wildlife and in promulgating the ideals for its effective preservation.

NORMAN ARTHUR WAKEFIELD, the 1962 Medallionist, is much better known by Victorian naturalists than is Mrs. Stead. He had the good fortune to be reared in the Orbost district of East Gippsland where early excursions with his father helped to spark off a great enthusiasm for the bush and its myriad fascinating occupants.

Just before turning 16 he became a junior teacher at Orbost State School and has remained with the Victorian Education Department ever since. A noteworthy feat of early years was to share with his younger brother, Allan, a trip up the Snowy River in a little home-made canvas canoe from Orbost into the rugged gorge tract (above the Buchan R. confluence). During this exploit, which recalls a very similar one by James Stirling and an aboriginal companion in the 1860's, the two brothers endured 16 strenuous days and were obliged to live "off the land". Contacts with Frank Robbins (one-time science teacher at Orbost) and the late W. H. Nicholls (of orchid fame) whetted Norman's appetite for botanical inquiry—particularly among the ferns and orchids. And, later, at the Melbourne Teachers' College he was further influenced by that grand old naturalist and recipient of the 1943 Medallion, Major H. W. Wilson. It was Nicholls who introduced him to membership of the F.N.C.V. in May 1938.

Many a young teacher would have shunned appointments in such small and

remote country schools as Combienbar, Bindi and Genoa; but not so Wakefield who regarded these places as convenient base camps from which to explore the wild and little known hinterlands. Thus he added treasure after treasure to his imposing list of botanical novelties for Victoria—no less than 16 new fern records were among them. Between Nov. 1939 and Feb. 1956 Norman contributed 25 papers on our pteridophyte flora to the *Victorian Naturalist*, describing six new species, and his careful researches culminated in the production of the Club's popular handbook, *Ferns of Victoria and Tasmania* (1955).

Enlisting in January 1942, he was a bombardier with the armed forces, serving in the Solomon Islands and New Guinea. Even these difficult times did not prevent the collecting of his precious ferns, at every available opportunity, and army cooks were persuaded to let him dry them off by the warmth of their kitchen stove. Some 600 valuable fern specimens were the result of his Wartime botanizing in the tropics, and the first set of 322 numbers has been presented to the British Museum (Natural History) in London, the remainder being lodged at Melbourne Herbarium.

In Nov. 1952 Wakefield took over editorship of the *Victorian Naturalist* in which, among other papers, he published a series of 13 contributions entitled "Flora of Victoria: New Species and Other Additions" (between June 1955 and April 1957). Altogether, he described 33 new species in this important series. Honorary membership of the Field Naturalists Club was conferred in Nov. 1956 for his meritorious labours as editor: not only did he raise the quality of the journal, but he organized sales of the Club's publications so vigorously that from 1955 onward the disposal of back numbers of the *Victorian Naturalist* has added £1500 to the Club's revenue. May 1959 saw the journal with a complete "face-lift"—art paper, a different picture each month on the cover, more illustrations, double columns of type and bold staggered headings. The popularity of this new and attractive format is reflected in augmented sales of the *Naturalist* and a continuing boom in Club membership.

Wakefield's floristic studies continued into 1960; but since then he has concentrated on the mammalian fauna of the State, with particular emphasis on subfossil deposits occurring richly in limestone and basaltic caves. The number of jawbones that he has examined and identified during these investigations must run into many thousands. In 1963 he contributed the leading article (Mammals of Victoria) to the *Victorian Year Book* No. 77, and he has been the leader, since its formation in 1960, of the Fauna Survey Group within the F.N.C.

Always keen on ornithology, he has published numerous papers on bird-life; probably the most important was a detailed and critical survey entitled "The Yellow-tufted Honeyeater, with Description of a New Sub-species", published in the *Emu* Vol. 58, pp. 163-194, with 8 plates and 2 maps (July 1958). All these projects have been well illustrated by his own line drawings or nature photographs.

In June 1955 he stepped into the shoes of his late mentor, Major Wilson, as a lecturer in Nature Study at the Melbourne Teachers' College. During 1957-59 he was granted part-time to attend the University of Melbourne, graduating as Bachelor of Science in Feb. 1960 with Botany as a major subject. More recently he has been allowed special facilities at Monash University to work on his vast collection of mammal bones from Victorian caves.

He has maintained a close liaison with the National Parks and Fisheries & Wildlife Authorities, concerning the conservation of native plants and animals in adequate habitats; and he has been a member of the Committee of Management for both Mallacoota and Gippsland Lakes National Parks. For some years he was a council member of the Victorian National Parks Association.

In the sphere of public relations, Norman Wakefield has given many lectures to youth groups and naturalists' clubs throughout the State. A weekly column in the Melbourne *Age* is devoted to current topics of natural history interest. He has published a large number of articles in the *School Paper* and *Education Magazine*, and has reached a larger audience through radio and television—e.g. 54 fifteen-minute broadcasts during 1960-62 in the series "Nature Study for Schools".

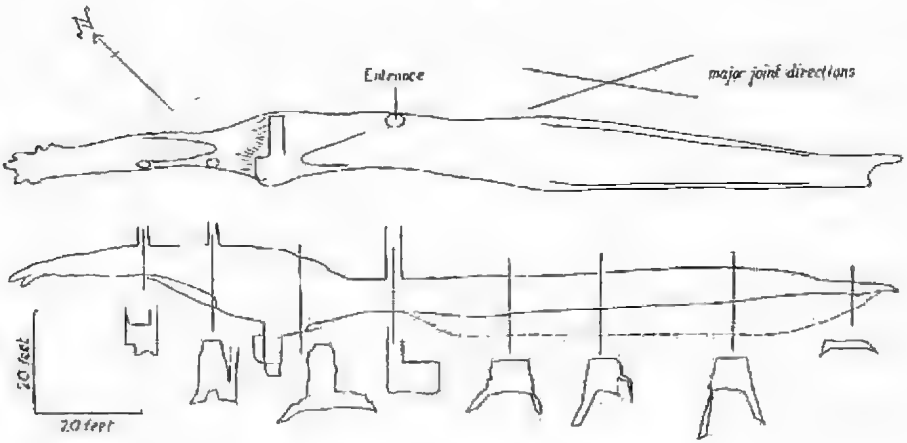
His work invariably carries the imprint of authority—of careful investigation, profound personal knowledge and lucid presentation. No other living Australian was more worthy of the 1962 Medallion than this extremely active, dedicated naturalist.

McEachern Cave, Nelson

By C. D. Ollier

McEachern Cave is situated about four miles north of Nelson close to the border between Victoria and South Australia in an area of nearly flat-lying Oligocene limestone with well developed bedding planes and joints. There has been a gradual emergence of this part of Australia from beneath the sea, and the coastal area is topographically younger than the inland parts. This change in age is reflected in the geomorphology, and while well developed karst features are found inland (including the Naracoorte Caves), juvenile physiographic features are found near the coast. McEachern Cave, then, is an example of a young limestone cave, of a type which has scarcely been mentioned in the literature.

The cave is an elongate rift with a shape and direction largely determined by joints. The joints can be seen clearly in the cave, sometimes as slightly irregular cracks in the roof and sometimes the actual cave walls are joint planes. Although the joints are not perfectly straight, it is clear that there are two main sets of joints intersecting at about 30°, and there is also at least one other set of minor joints. The joints are not vertical but slope at various angles, often about 10° from vertical. The ceiling of most of the cave is a bedding plane, complete with some fossil lamellibranchs, and the matching bedding plane surface is found on the fallen blocks below. Most of the cave is bounded by joint and bedding planes, and the present cave is due to collapse of a large block that still lies, a little broken up, on the floor. This can be seen in the cave sections, and it is also



Plan and Sections of McEachern Cave

apparent that collapse was enhanced by the joints sloping towards each other, making a tapered block which could collapse with greater ease than a vertical-sided block.

Solution features are present as well as collapse features. On joint planes, especially the large joint plane to the south east, there are large solutional pockets, which would appear to indicate phreatic solution at some time when the water table was above the level of the present cave. At the lower levels of the present cave, the flared edges shown in the sections of the southern half of the cave, are further solutional surfaces which possibly mark the roof of a former cave before collapse.

Other solutional features of interest are the pipes. The most obvious one is the entrance shaft, a nearly cylindrical pipe about 4 ft. across and 50 ft. deep. Similar pipes are not uncommon in this area, and have a remarkable circularity, very like artificial wells. The openings of other pipes can be seen inside the cave, and some are still full of clay. It is probable that all the pipes develop as solution pipes at first, and later lose their fill of clay. Solution pipes are often exposed in quarries, and they have the same circular cross sections. The circularity suggests equal solution in all directions, around some nucleus such as a joint intersection or the tap root of a tree.

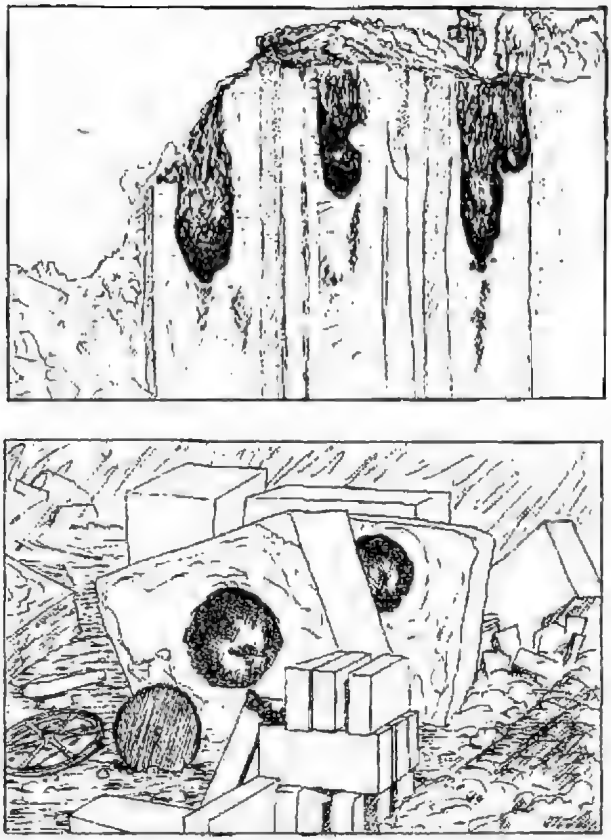
Calcareous deposition in the cave is very slight, but there are two or three small stalactites about an inch long, and a little calcrete on parts of the floor.

The cave is considerably infilled with a variety of sediments up to at least eight feet deep in parts, and associated with an interesting assemblage of bones. This is, in fact, the first Victorian cave with stratified cave deposits, and for this reason alone is of considerable importance. The deposits are being studied extensively by several people, and details of the sediments and fossils will be reported elsewhere after much further work has been done on them. It is of interest that the main cave-collapse took place before the overlying cave fill with extinct animals was deposited, and since then there has been negligible further rock fall.

The sequence of development at McEachern Cave is a simple one. First a cave was developed along bedding planes below the level of the present cave and solutional pocketing also weakened the joints. A large block then collapsed from the roof, largely filling the old cave and forming a new one above. Since then there has been infilling by sediment but little further cave formation by solution or collapse.

Little has been written on the caves of this part of Victoria, but from my own observations and from discussion with Mr. Elery Hamilton-Smith, who has also visited other caves in the region, it seems that McEachern Cave is fairly typical of the caves in this region. Other caves I have visited had less collapse, and consisted mainly of bedding plane solution caves, sometimes at several levels, in conjunction with solution pipes. The bedding plane caves have solutional spongework and pendants on the roof; they are never more than a few feet high unless collapse occurs, and are very much wider than high. Also they tend to be irregular in plan rather than elongate, and collapse affects broad areas of floor rather than joint blocks. Mr. Hamilton-Smith, however, has visited several caves which do have joint-block collapse of the McEachern type.

Some caves I have visited have a layer of flaky calcite on the floor. This



Drawing of vertical sections (above) and cross sections (below) of solution pipes exposed in a quarry near Mt Gambier, showing how the pipes are formed originally with a clay-fill. Presumably solution proceeds at approximately equal rates in all horizontal directions tending to give circular cross sections, but the most rapid growth is vertically downwards, aided by the movement of water under gravity. The clay filled pipes at McEachern Cave are believed to be of this type, and the shafts are old pipes that have lost their clay-fill.

originates as a thin layer or film of calcite on the surface of water, and when the water drains away the thin sheet of carbonate breaks up into small fragments rather like soap-flakes. This sort of evidence for high water tables is absent from McEachern Cave. Stalactites, which are very rare in the McEachern Cave, have been completely absent from other caves that I have visited in the area except the Princess Margaret Rose show-cave, which is mainly an enlarged joint with considerable decoration and does not appear to be very typical of its area.

To summarise then, McEachern Cave appears to be typical of its area, but more work and surveying must be done in other caves to establish this better. It is also hoped that further work will document the sequence of cave development from the well-developed Naracoorte caves to the simple, young caves of the Nelson area.

Bush Brushes

The fox's brush was the traditional trophy of the chase. The Field Naturalist usually returns from an excursion into the bush with a different sort of "tale". If you have one worth mounting and preserving send it to the Assistant Editor, "Victorian Naturalist", 102 Murray Road, East Preston, N.18, Victoria.

Wattle—20 Years Old

This article originally appeared in the Melbourne *Herald* of September 12, and is worthy of some comment. It was forwarded by Miss Marie E. Argo, of Elwood, who felt it to be an item of general interest to naturalists.

"For this Spring in Canberra, time has run back more than 20 years.

"The golden glow of wattle trees in vigorous full-bloom has been the keynote of the last fortnight's colour.

"Wattle dominated Canberra for its first 10 or 15 springs.

"Wattle trees—more than half a million—had been planted along the streets as windbreaks.

"They died out or were removed in the late 1930's, and except on the outskirts of the city, wattle had become almost a rarity.

"The trees blooming this year are all young, vigorous and self-sown.

"Doubtless, most of the seeds, from the old trees, have been dormant in the soil for 10 years or more".

The statement made in the last paragraph raises some rather interesting questions. What causes seed dormancy? How long will dormant seeds remain viable? What eventually causes inability to germinate?

The causes of seed dormancy are numerous, and vary from one group of plants to another. Amongst the most important is the fact that all seeds contain a relatively high (about 8%) concentration of carbon dioxide and this induces Carbon dioxide Narcosis in the embryo. Germination cannot occur until most carbon dioxide is removed.

A second important factor is the amount of water present in the seeds. In many cases, seeds planted fresh from the plant will germinate immediately, but once the seed is allowed to dry out, then the seed cannot be made to grow for some years. In all cases, dry seeds contain less than 10% water, compared to about 93% water in the seedlings. Seeds thus cannot germinate until much water is taken up from the soil, and hence availability of water will affect germination. Some species show impervious testas which must be damaged in some way before water may be taken up.

In other species, testas are impermeable to oxygen which is required for the respiration of the germinating seedling. Others again require "stratification" or subjection to very cold temperatures before germination will occur. Some species require light for certain periods to stimulate germination, but in others germination is inhibited by light.

Most ephemeral plants show an extremely rapid germination of seeds after abundant rain. However, if rain is slight, practically no germination takes place. In these plants

germination is prevented by the inclusion of certain chemicals within the testas. These chemicals act as germination inhibitors. They are water soluble and after considerable rain has fallen, the chemicals are washed out from the testa, permitting germination to occur. This is of considerable ecological importance because it ensures that there is a plentiful water supply for the seedling.

Certain other plants produce seeds in which the embryos are physiologically and structurally immature. These seeds need a dormant period, during which the embryo matures, before germination is possible.

Similarly, there is great variation in the viability of seeds. Some genera show consistently long-lived seeds, whilst in others seeds can only germinate during much shorter periods.

Some species show a percentage germination over a number of years, even though all seeds are planted together.

Briefly, there are three main groups. Short-lived seeds remain viable for up to three years. Intermediate species have seeds which are viable for up to 15 years, and long-lived seeds may germinate 100-150 years after setting. Two Australian genera, *Goodia* and *Hovea*, have been shown to germinate after 105 years. Certain unusual species have seeds which remain viable for even longer periods, and in one instance, seeds of the Indian Lotus *Nelumbium* were taken from a dry lake-bed and germinated. These seeds must have been at least 300 years old, as this time had passed since the lake contained water. Radiocarbon dating of identical seeds from the same location indicated that they were approximately 1000 years old.

Seeds are thought to become nonviable due to the "denaturing" of proteins. The embryo is composed mainly of protein, and over long periods this may become changed or denatured in a similar manner to egg-white after cooking.

—R. H. J. McQ.

White Wattle Scale

The following query has been sent in by Ida F. Knox, of Mornington. Several specimens of the scale referred to were also forwarded.

I am sending you some sprigs of the Beach wattle *Acacia sophorae*, heavily encrusted with scale. I am wondering if this scale attacks any other native tree except the wattle.

The tree is one of two seedlings growing together, and most of it seems to be dead, so it has been cut well back, hoping it may shoot again. The tree has bloomed each year, making a splendid splash of colour.

The scale insect concerned is one of a large number of closely similar species belonging to the genus *Eriococcus*, and is commonly called White Wattle Scale. Members of this group of scale insects attack both wattles and eucalypts. In most instances, colonies are attended by small black ants, *Iridiomyrmex itinerans*, which utilize the "honeydew", exuded by the scale, as a food substance. These ants are responsible for spreading the scale throughout an infested tree. Scale insect larvæ are picked up in the jaws and carried to new positions on the tree. This measure prevents overcrowding and results in a far greater population of scale insects which can be exploited by the ants.

—R. H. J. McQ.

Why Buy TV?

The following notes on a successful pond hunt have been sent in by Mr. D. E. McInnes, who hopes they will stimulate other pond-hunters to contribute to these columns.

After missing a club excursion by several minutes at Ringwood, I drove on to Yarra Glen. Several hundred yards before reaching the bridge over the Yarra River, I noticed that on the left was a billabong which looked to have possibilities for pond-life. On the journey home I stopped just to have a sweep with the pond net.

What a pond! The pond hunter's dream.

There were spherical rotifer colonies (*Lacinularia*) rolling through the water, and green balls of *Volvox* revolving along in stately fashion. Darting everywhere were little rounded green, brown and mottled busybodies (*Ostracods, Cypris*) with some bean-shaped light-green relations mixing in. A flash of bright red legs and body indicated brilliant water mites *Hydracarina*.

Cyclops, with a single shining red eye and a bunch of green eggs contrasted with another Copepod new to me, with a bright blue body and an egg-sac of red eggs. What a shot for a photomicrograph!

Waterfleas, *Daphnia*, were present in small numbers, and here and there a *Hydra* waited patiently for a victim. The voracious Dragonfly larvae were making short work of small tadpoles in the catch, with Damsel-fly larvae also doing their bit to deplete numbers.

Running into the water were several water spiders *Dolomedes*, each completely clothed in a shining air bubble.

Filamentous alga was plentiful, but the desmids were represented by only one, *Closterium*. An unusual branched green alga, *Drapurnaldia*, was seen strung through the collection.

Even a small yabbie found his way into the catch.

Two jam jars of the material provided Sunday night's entertainment.

Book Review:

THE INSECTS OF HEARD ISLAND

By K. G. Brown

Obtainable from the Publications Office, Antarctic Division, Department of External Affairs, 568 St. Kilda Road, Melbourne, S.C.3.

This book is No. 73 of a series of reports from ANARE (Australian National Antarctic Research Expeditions). It is an interesting, easy to understand, scientifically accurate report dealing with all the insects found at Heard Island, even the occurrence there of the domestic fly *Musca domestica*. Five insects new to science are described, and there are many accurate line drawings and also life histories. One of the new insects is a small moth of the family *TINEIDAE*. The book deals with 25 insects and includes photographs of the vegetation found there which supports some of the insect fauna.

A map showing the position of Heard Island and neighbouring islands on which some of the insects occur is included.

A comprehensive list of previous reports dealing with many subjects is given at the back of the book.

—R. Condron

Pterostylis alata, Striped Greenhood

—By J. M. and W. H. King

This is one of our autumn-winter flowering greenhoods and has a wide distribution throughout the State, excepting the north-west. The Striped Greenhood is sometimes known as the Striated or Purplish Greenhood.

We have never found this orchid growing in great numbers, but during the season just passed, it was reported to be flowering abundantly in the Brisbane Ranges. A small isolated colony growing on a rocky hillside at Warrandyte flowered, but the flowers were not as numerous as in previous years. This also applied to the Autumn Greenhood *Pterostylis revoluta*, which grows in the same area. Many rosettes appeared, but there were very few flowers.

The flowering plants have no leaves, the blue-green rosettes appearing later. The plant has a single flower on a slender stem which is from four to eight inches high. This stem has several bracts, at times resembling small leaves.

The flower has an acutely pointed short brown tongue. Flower colouration is quite variable. The specimen in the illustration was photographed in the You Yangs, and was a translucent white with green stripes; whereas the flowers at Warrandyte had sepals and petals tipped with a warm brown colour and were more heavily striped.

Pt. alata has also been found recently at Ararat, Stawell and Frankston.

Pterostylis alata

—Photo.: *J. M. King*

Results of Excursions in the "*Voluta*" to Wilson's Promontery and to Westernport Bay

By David Howlett

Friday, 20th December, 1963

Weather: Winds light east to north-east; a fresh southerly in the late afternoon; light swell.

General report: Left Flinders at 12.20 a.m., arrived at Gt. Glennie Is. at 3.30 p.m.; lost about 20 minutes on the trip baling out the dinghy; trip reasonably good; spending the night at Gt. Glennie Is.

Saturday, 21st December, 1963

Weather: Very light northerly winds for most of the day, fresh south-westerly winds in the late afternoon.

General report: Had two runs with a small beam-net close inshore on the south-eastern end of Norman Is. without success; seabed seems to have more weed on it compared with the previous year. Had several runs with the net close inshore north of the anchorage at Gt. Glennie Is. without success, later located bottom containing large quantities of dead shell and coral at a distance of approx. 400-1760 yards to the east of the anchorage at Gt. Glennie Is. in depths around 20 fathoms.

16 Juvenile *Spondylus tenellus*, 1 *Neotrigonia margaritacea*, several chitons, 2 *Negyrina subdistorta* and several other molluscs were taken in the dredge.

Sunday, 22nd December, 1963

Weather: Light north-westerly winds with a light swell.

General report: Had six good hauls with the dredge on ground found the previous day. Owing to the large quantities of dead shell brought up it was necessary to go to the anchorage to sort the material. I estimate that I was averaging around 100 lb. of material for each ten minutes spent dredging, which in turn took at least 1 hour to sort, so that the six hauls with the dredge for the day took six hours to sort.

On this excursion I used a light framed dredge, 4 ft. 6 in. wide, with a bag of 1½ inch mesh about 8 ft. long which, as the results show, proved to be quite effective.

Specimens of *Spondylus*, *Neotrigonia*, chitons, *Pecten asperrimus*, *Murex triformis* and *denudatus* were taken, also *Tucetilla flabellatus*, also two specimens of *Umbilia hesitata* were taken alive.

Monday, 23rd December, 1963

Weather: Gradually freshening westerly winds with a light swell.

General report: Had four good hauls with the dredge, a certain amount of time was spent rectifying trouble with the propellor shaft coupling. A variety of molluscs similar to that of the previous days were taken from the same area.

Spent the previous two nights at Gt. Glennie Is.

Tuesday, 24th December, 1963

Weather: Barom. 1004 mb, calm all day.

General report: Had approximately nine hauls with the dredge at various localities within a mile radius to the east of the anchorage at Gt. Glennie Is. Some of the hauls were light. Later

concentrated on the area where the *U. hesitata* were taken resulting in averaging slightly better than one per haul. A similar variety of molluscs to the previous days was taken besides 4 good specimens of cassis, with hermit crabs in them, taken in traps set.

Wednesday, 25th December, 1963

Weather: Barom. 996-1000mb, rather heavy wave roll during the previous night from the north with little wind; flat calm at daybreak, wind soon freshened to a strong northerly which suddenly changed to a galeforce southerly at 10.00 a.m.; surface of the water white at times due to the force of the wind in the anchorage. Very frequent wind gusts lifted the water to mast height at times to form a wall of spray. The anchorage at Gt. Glennie Is. being very small, I was never more than 100ft from the shore.

One empty 15 gall fuel drum was blown overboard, did not attempt recovery due to the wind.

Spent the day sorting the material gathered the previous day, resting and watching the anchors.

Landmarks for the cyprea area: western side of Rodondo Is. touching the eastern side of Kanowna Is. Dannevig Is. just open of Gt. Glennie Is., then proceed in a northerly direction until the lighthouse on Citadel Is. touches Gt. Glennie Is.

Thursday, 26th December, 1963

Weather: Barom 1004-1008 mb, galeforce westerlies in the morning followed by strong westerlies in the afternoon.

General report: Had to spend a greater part of the previous night and a part of the day on anchor watch due to the variation in wind direction; weather showing signs of moderating. Spending the night at Gt. Glennie Is.

Friday, 27th December, 1963

Weather: Barom. 1008 mb, light variable breezes all day with a rather heavy swell.

Went to Waratah Bay in the hope of locating suitable dredging bottom with a different variety of molluscs to those taken at the Glennie group of islands, also with the prevalence of westerly winds in the area at this time added another attraction for going to Waratah Bay.

Had four unsuccessful shots with the dredge at various places in a south-easterly direction from the township in depths to 14 fathoms. Spending the night in Waratah Bay.

Saturday, 28th December, 1963

Weather: Barom. 1006 mb, thundery conditions at first with light variable winds followed by a south-west change in the afternoon with winds of about force 4.

General report: Tried at various places until a position was reached with the Cape Liptrap light bearing 336 degrees T, Bell Pt. bearing 22 degrees T.

Fouled the dredge on each occasion that it was shot causing severe twisting of the cutting edges. No shells taken in the dredge. Spending the night in Waratah Bay.

Sunday, 29th December, 1963

Weather: Swell still rather heavy, calm all day with extremely light breezes from the south-west sufficient only to reduce some of the roll from the boat.

General report: Left Waratah Bay at 4.55 a.m., Cape Liptrap light abeam at 6.55 a.m., arrived at Flinders at 4.30 p.m.

Spent half an hour with the dredge at a position approximately 4 miles to the south-east of the Nobbies

on Phillip Is. without success on the way home.

Summary of the Excursion to Wilson's Promontory

For the benefit of those who are not familiar with my boat, it is 20 ft long, designed as a fishing sailing boat hence my exemption from the Motor-boat Registration Act.

I named it "Voluta" for identification and also the name Voluta fits in with the purpose for which I keep the boat.

Although with the sails I have an unlimited range, my effective working range and time spent at sea is dependent on the amount of fuel that I can carry, which is about 60 gallons, sufficient for a trip like the one just completed.

As the boat is powered with a 12hp Simplex motor and confined to a maximum speed of six knots I have to be extremely weather-conscious, making the most of calm weather and confining my activities where possible to the lee side of islands where anchorages are available.

From my experience so far dredging in the ocean waters of Victoria, it seems that the most profitable areas are those where there is a large quantity of dead shell, sponge, coral and a little sea weed.

In the case of Gt. Glennie Is. the shell consisted mainly of the valves *Pecten alba*, also at Gt. Glennie Is. the scallop *Chlamys asperrimus* was plentiful to the extent that several specimens were taken alive each time my traps were hauled.

I work solo on trips such as the one completed as, apart from the fact that there is no room for another person with the amount of gear carried, there are other problems which outweigh the advantages to be obtained by having company.

At Gt. Glennie Is. the March Flies are a first class menace making work very difficult.

Westernport Bay

Monday, 27th January, 1964

Weather: Barom. 1016 mb, light southerly winds all day with a heavy swell.

General report: Took soundings until a position was reached with the light on Grant Pt. bearing 82 degrees T and the eastern end of West Head bearing 32 degrees T.

Had a short drag with the dredge until fouling with rock.

Bottom very promising with sponge, dead shell and similar material on it.

1 *Notocypraea angustata* Gmelin.

Weather unsuitable for continued dredging.

Saturday, 29th February, 1964

Weather: Barom. 1000 mb, flat calm all day with thundery conditions prevailing; swell, none; southerly change at dark.

General report: Spent approximately 2 hours dredging to west of a position with West Head bearing 256 degrees T and the lighthouse on Grant Point bearing 156 degrees T; at the position given, a large quantity of small dead shells and coarse sand was taken. Dredging commenced at the above position as a southerly change was predicted for early in the day.

Later I moved to a position with the Cape Schank lighthouse bearing 296 degrees T and West Head bearing 36 degrees T.

Started dredging at 12 noon and ceased at 4.00 p.m.

Dredging was confined to area of a mile radius of the above position on a bottom consisting of small stones, gravel, coral, sponge, coarse sand and rock.

A list of molluscs taken in 20 fathoms east of Gt. Glennie Is. Dec. 21st-24th 1963.

(a = Adult, d = Dead, j = Juvenile)

Spondylus tenellus Reeve, 160a.
Myochama anomioides Stutchbury, 6a.
Amygdalum beddomei Iredale, 1d.
Pecten alba Tate, 1a.
Chlamys asperrimus Lamarck, 150a.
Chlamys atkinos Petterd, 1a.
Mesopeplum tasmanicum Adams & Angas, 12a.
Eucrassatella kingicola Lamarck, 5a.
Talabrica aurora Adams & Angas, 1a.
Tucetilla flabellatus Tenison Woods, 30a.
Tucetilla radians Lamarck, 4a.
Limopsis tenisoni Tennyson Woods, 1a.
Umbilia hesitata Iredale, 9a.
Ellatrivia merces Iredale, 1a.
Notocyprea piperita Gray, 2a
Pterynotus triformis Reeve, 2a.
Torvamurex denudatus Perry, 8a.
Negyrina subdistorta Lamarck, 6a.
Cabestana waterhousei Adams & Angas, 1aj.
Subninella gruneri Philippi, 1a.
Astelle subcarinatum Swainson, 4a.
Argobuccinum bassi Angas, 3a.
Proximitra pica Reeve, 1a.
Microginella cymbalum Tate, 6a.
Xenogalea pyrum Lamarck, 5d.
Cena impertusa Burrow, 1a.
Tugali cicatricosa, A. Adams, 5a.
Hemitoma subemarginata Blainville, 6a.
Capulus australis, 2a.
Neotrigonia margaritacea Lamarck, 2a.
Ischnochiton falcatus Hull, 5a.
Ischnochiton rateanus Bednall, 1a.
Ischnochiton versicolor Sowerby, 1aj.
Ischnochiton elongatus Blainville, 13a.
Rhyssoplax tricostalis Pilsbury, 1a.
Rhyssoplax exoptanda Bednall, 6a.
Acutoplax inayi Torr, 1a.

A list of mollues taken on 29/2/64.

In Westernport—

Gomphina undulosa Lamarck, 8a.
Neotrigonia margaritacea Lamarck, 1aj.
Tawera lagopsus Lamarck, 1a.
Tucetilla radians Lamarck, 12a.

South of West Head—

Neotrigonia margaritacea Lamarck, 2a.
Chlamys asperrimus Lamarck, 1a.
Tucetilla radians Lamarck, 2a.
Cabestana waterhousei A. Adams & Angas, 1a.
Argobuccinum bassi Angas, 1a.

The Naturalist and the Microscope

Some Hints on the Use of F.N.C.V. Microscopes

—By D. E. McInnes

When the microscopes are new the tubes are fitted to the sleeves to give a firm sliding movement that will not slip, but in a number of cases this has been found to be too hard for children and some others with fingers not so strong. Again, tubes have been noticed to become stiff after much use. What can be done to make the tube just right? Well, first, do not attempt to use grinding paste on the tube to lap it in the sleeve, as this will grind away the chrome plating and spoil the look of it. If the microscope has had plenty of use, perspiration on fingers may cause the inside of the brass sleeve to gum up with verdigris. The remedy is to remove the tube and wipe it and the inside of the sleeve with a clean linen cloth.

To ease a tight tube, remove from sleeve and gently file the inside of sleeve with a fine half round file or rub with emery-paper wrapped round a suitable-sized piece of wood dowel; try the fit often to make sure the tube does not become too loose; be careful to remove any emery dust from the sleeve and the slots in the sleeve.

In the case where the tube is too loose, remove the tube, unscrew the sleeve from the microscope box, place the sleeve in a vice and slowly squeeze the top of the slotted sleeve. Again try often, until the fit is just right. Don't use oil or vaseline as a lubricant—they will gum up. "Dry Lube" as used on car door latches is quite good. The main thing is to have a tube that is just right for you.

When using top lighting and the 3X objective, try wrapping a piece of thin black cardboard around the front of the objective so that it forms a tube projecting ½ inch past the end of the objective. Retain it in place by slipping an elastic band round to hold it tight. This simple arrangement will allow you to bring the lamp very close to the object without the light causing glare up the objective.

An alternative method is to cut a shield of dark cardboard and clip with a rubber band to the lamp-tube so as to allow light to fall on the object, but not to enter the objective tube.

Members who have purchased the light intensifier lens (lamp condenser), designed by Mr. Woollard for use with the F.N.C.V. microscope, will find that it will help to give very good dark ground illumination for pond life when the higher power objective or eyepiece is used.

The low power dark method is to place the lamp in the clip under the stage, slip the opal slide to the opposite side out of the way, arrange the lamp to one side so that it illuminates the object but does not shine into the objective, then push in the black board to provide the dark background. This method is suitable for the larger pond life, but for minute creatures which require a 10X objective the use of the lamp condenser will give better resolution.

Arrange the lamp in the top lighting position and place the slide or flat dish containing the pond life onto the stage, having moved the opal slide out of the way beforehand. Focus on the object. Now clip the lamp condenser onto the lamp-tube and arrange so that the light is concentrated onto the object. This will show up your object, sharply illuminated against the dark shadow of the hole in the centre of the stage.

Two points will help you to obtain better results. First, keep the water to the minimum depth necessary for the particular organism being examined; deep water will give a fuzzy image. Next, restrict the amount of material in the field. Remember that all the unnecessary weed or rubbish is reflecting light and helps to dim the image of the object you want to observe.

Another helpful hint is to focus onto the bottom of the dish. Many of the small pond creatures seem to prefer wandering around in that area.

Don't forget to experiment with the lamp condenser. Vary the angle and direction of the light beam and observe when the best result is obtained.

Have you a helpful hint, or some difficulty you want solved regarding the F.N.C.V. microscope? Don't forget there are now 140 F.N.C.V. microscope tubes being used by members from Queensland to Tasmania, and these members will appreciate items of interest concerning their new approach to the study of Nature.

Field Naturalists Club of Victoria

General Meeting—October 12, 1964:

The President (Mr. M. K. Houghton) opened the meeting and welcomed members and friends. The attendance was smaller than at most recent monthly meetings. The Minutes of the September meeting were confirmed, and the President then reported that Council had considered suggested changes to the boundaries of the Mallacoota National Park and instructed the Hon. Secretary to write to the Ministers of Lands and National Development and to the National Parks Authority giving the Club's views. He invited Mr. J. Ros Garnet, President of the National Parks Association to explain to Members the significance of the proposals.

With the assistance of a map, Mr Ros Garnet described the history and geography of the Park. Created in 1909, most of it was still in its original untouched state. Because of the sometimes hard to interpret definition of its boundaries, it was difficult to give its exact extent, but there were about 11,000 acres. Of particular interest were the gullies containing tropical rain-forest resembling botanically areas situated much further to the north. To the north-west was situated an area of 1280 acres that had been surveyed as a township in 1901 but, because of difficulty of access, never used as such. Part of the proposals envisaged the addition of this area to the Park in exchange for an area of similar size on the western side of Mallacoota township so that the latter could be developed by division into blocks. In this way there would be an increase of the rateable buildings in the Shire of Orbost and room for the provision of better facilities for tourists. Included in the scheme was the rationalization of boundaries. However, where boundaries followed natural features, even at a distance, the position could not be improved by drawing straight lines on the map. Some years ago there had been a suggestion that the Park might be extended by the addition of further land to the north-east. Orginally this area had been 21,000 acres, but much of it had now been declared State Forest, and only about 7,000 acres of heath land, sand-dunes and two freshwater lakes now remained. Mr. Ros Garnet said that Members should oppose this scheme with all the strength that they could muster. They could explain the situation to their parliamentary representatives and see that the matter was ventilated in the Melbourne and country newspapers. It was better to oppose the project now than to wait until after the Bill had been drafted. Mr. Ros Garnet was supported strongly by Mrs. Taylor, who stressed the value of the Park to bird watchers.

Mr. Coghill reported that Mr. Hooke had sent a telegram of congratulation on behalf of the Club to Miss Waddell on the occasion of her 80th birthday, and read her letter of thanks. He mentioned the Natural History Medallion, on exhibition on the table, which was to be presented to Mrs. Thistle Stead at the November meeting.

The subject for the evening was the Port Fairy Excursion of Easter, 1964. Except for an interesting account by Mrs. M. Salau of the geology of Tower Hill, the commentary was given by Mr E. Swarbreck. He showed a selection of slides taken by ten Members who went on the excursion, and gave an excellent and often amusing narrative. (An account of this excursion will be found in the June issue of the *Naturalist*.) Mr. Swarbreck concluded with a brief account of the migration and breeding habits of the Mutton-birds, and showed fine photographs of the banding of adults by Miss Bowker and others on Griffiths Island.

The President thanked Mrs. Salau, Mr. Swarbreck and all who had lent slides for a most interesting evening.

The new Members listed on page 186 of the October *Naturalist* were elected.

Mr. Hugh Stewart mentioned a display of Geraldton Wax-flower which he had brought for the table from a neighbour's garden. The bush, which was flowering for the fifth time, had been grown from a cutting and was now 8 feet high. The wax sheen of the petals gave the impression of plastic artificial flowers. Another vase on the table contained garden-grown *Melaleuca squarrosa* brought by Mr. E. S. Hanks. Mr. W. Cane exhibited a sprig of Swan River Myrtle, *Hypocalymma angustifolia*, a native of Western Australia, grown in his garden at Upper Maffra.

Mr. E. Francis exhibited a collection of silicified stones, cherts and jasper

from the Heathcote area. Under two P.N.C.V. microscopes, Mr. D. E. McInnes showed specimens of limestone from the quarry at Fyansford, Geelong.

Mr. J. Baines referred to a photograph of a mystery animal shown recently in a television programme. It was possible that the Thylacine still occurred in the Portland area. Miss Chisholm mentioned a shearwater that landed on the deck of a ship proceeding from Australia to England. It was caught in a shawl and shown to many of the passengers; sailors considered it unlucky to have these birds on board.

Geology Group—October 7, 1964:

Thirty members and visitors were present, with Mr. L. Angior in the chair.

The secretary reported on the excursion to Coimadai on Sunday, September 13, when fifteen persons attended. After a brief description had been given of the area, the party moved to the Coimadai Creek to inspect a glacial pavement and other scored beds. Further along the creek beds of tillite were examined, and Tertiary deposits on the higher ground were seen. After lunch the dolomite quarry of Alkemade Bros. was inspected and many of the different beds were traced in the quarry wall, but a search for the Ostracod Bed proved fruitless. The party then proceeded to Taylor's Lime Works to view the crushing plant, quarry and the fault line higher up the hill. Regret was expressed that the area would, in a couple of years, be flooded by the waters of a dam, Lake Merrimu, to be constructed on the site.

The Chairman thanked the committee for their fine effort in arranging the Group's exhibit at the Nature Show.

The Secretary appealed for subjects and speakers for the 1965 syllabus, and for speakers to visit country clubs who had asked for assistance.

Arrangements were made for an excursion to the Australian Cement Quarry at Fyansford, Geelong, on Sunday, October 11.

Mr. John Branson, B.Sc., F.G.S., was the speaker for the evening, and his subject, "Geological Investigations in Antarctica". The lecturer first mentioned that geology was evidently in his blood, for his grandfather had been an amateur geologist in Cumberland, England. Any attempt at geology in Antarctica was made most difficult by the lack of maps, the few outcrops and the climatic conditions. Outcrops were widely separated, of different rock structure, and the

intervening country was covered by thousands of feet of ice. In the intense cold it was impossible to take field notes, and so much time was taken up with merely keeping alive, that only about 10% of one's existence could be devoted to geology. The Great Southern Continent could be divided into two sectors, one an ancient shield area and the other formed on the side of it, of much later deposits. The rocks of the shield area were much altered, many of the granites being changed to gneisses, with clots of garnets. The granite had weathered to a monotonous red-brown colour, with large felspars, but little biotite. The area was considered to be late Pre Cambrian, but earth movements made dating difficult. Dykes were prevalent throughout. A sandstone, limestone and lignite with carbonaceous material was also found. In the newer section, dolerites with sandstones and other sedimentary rocks from Jurassic to Tertiary had been noted. Many dykes and intrusions could be traced in the outcrops. This area had been tilted with block faulting and rift-valley structures, and was probably a continuation of the Andean folding of South America. The block had been lifted to some 6,000 feet, and Tertiary fossils were present. The volcanic nature of Heard Island, where there were trachytic lavas 5,000 feet thick, were explained. Kerguelen Island had volcanics, but also Tertiary conglomerates, Pleistocene lignites and sediments of recent origin. The lecture closed with a series of slides, many of which were taken from aeroplanes, illustrating the different formations.

Exhibits: Ripple-marked sandstone, worm-tracks, fish spines and bones from Mansfield area, fossil wood flaked as abo. axe from Glenrowan (Mr. D. Dangerfield); lead, silver, zinc ore with fluorite and rhodonite, garnet crystal, green felspar, galena and quartz from Broken Hill (Mr. R. Davidson); brecciated marble and agata breccia from New Guinea (Mrs. Salau); oceanite from Madagascar, jasper, lignite, basalt, garnet, mica schist, gneiss, granite from Antarctica (Mr. J. Branson); agate cut and polished by Mr. Oates as a microscope exhibit (Mr. D. McInnes).

FIELD NATURALISTS CLUB LIBRARY

The following volumes and parts are required to complete sets of periodicals in the Library. Any information as to their availability would be welcomed by the Librarian, also prompt return of overdue loans of bound volumes and separate parts.

List 1.

Australian Journal of Botany, *Melbourne*.	Vols. 1 to 10 inclusive; Vol. 11, no. 1.
Auckland Institute and Museum—Record, *Auckland*, N.Z.	Vol. 5, nos. 3 to 6 inclusive.
Austral Avian Record, *London*.	Vol. 5, no. 2, and all later issues.
Australian Natural History (*formerly* Australian Museum Magazine), *Sydney*.	Vols. 7 to 10 inclusive; Vol. 11, nos. 4 and 11; Vol. 12, nos. 3, 5, 7, 9, 11, 12. Vol. 13, nos. 3 and 8; Vol. 14, nos. 1 and 5.
Australian Bird Watcher, *Melbourne*.	All issues from 1961.
Australian Museum—Records, *Sydney*.	Vols. 2, 5, 6; Vol. 23, nos. 2 and 5; Vol. 25—any issued after no. 16, and index; Vol. 26, nos. 3, 5, and any later issues.
Australian Naturalist, *Sydney*.	Vol. 5, parts 2 to 15 inclusive, and any later parts in this volume. Vol. 6—index. Vol. 11; Vol. 12, part 4.

Australian Plants, *Sydney*.	Vol. 1, nos. 7 and 8; Vol. 2, nos. 10, 13, 16.
A.S.F. (Australian Speleological Federation) Newsletter, *Sydney*.	Nos. 1 to 6 inclusive; 10 to 19 inclusive; Nos. 21, 23, and any later issues.
Australian Wild Life. *Sydney*.	Vol. 4, nos. 1 and 2; and any issues after Vol. 4, no. 3.
Australian Zoologist, *Sydney*.	Vol. 13, part 2 and any later issues.
Bird Lover, *Melbourne*. (annual)	Vols. 6; 7; 11; 13; 15.
Canterbury Museum—Records, *Christchurch*, N.Z.	Vol. 5, no. 2; Vol. 7, no. 1.
Clematis, *Bairnsdale*.	Any issues since no. 2.
Darling Downs Naturalist, *Toowoomba*.	Nos. 48, 49, 53, 64, 106, 107, 108, 109, 110, 111, 112.
Emu, *Melbourne*.	Vols. 30; 42; 44; 46; 48; 50; 52; 54. Vol. 63 part 4.
Endeavour, *London*.	Vol. 8; Vol. 11, nos. 41, 43, 45, 46. Vols. 13; 15. Vol. 18, nos. 71 to 76 inclusive.
Fur, Feathers and Fins (formerly Fisheries and Game Department Newsletter), *Melbourne*.	Vol. 19; Vol. 20, no. 79. Nos. 1 to 15 inclusive; Nos. 17 to 19 inclusive.
Linnaean Society of New South Wales—Proceedings, *Sydney*.	Vols. 11 to 20 inclusive; Vol. 82.

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Editorial

As most Field Naturalists have well-developed powers of observation, it is unlikely that the slimness of this *Victorian Naturalist* and its predecessor will have escaped notice. Enquiring minds will have sought an explanation, and the possibility that the Editor is short of material will doubtless have occurred to members. Whilst the Assistant Editor is still anxious to obtain many more Bush Brushes, however, the file entitled "Papers awaiting Publication" is at present sufficiently plump to withstand an anticipated *short* fast over the coming holiday period.

The present crisis is financial, and, in order that members may be able to appreciate the serious nature of the situation, we feel that a few facts and figures should be given. If the financial statement for 1963, on page 51 of the June issue, is examined, it will be noticed that the cost of printing volume 80 of the *Victorian Naturalist* was £1773, and the cost of blocks was £344. The total cost was, therefore, £2,117. It is true that, through the generosity of the Ingram Trust, production of the magazine was assisted by a grant towards these items of £208; but as such assistance can only be obtained for certain types of article, we can never assume that in other volumes our costs will be similarly reduced.

To the sum of £2,117 we must add editorial expenses, £25, and subtract the £216 received from advertisers. We now have the cost of producing 12 issues of 1,250 copies, £1,926, and by division, the cost of one copy, 2/6¾.

About 150 copies are printed each month in excess of those despatched to members, and sale of back numbers during the year in question yielded £188. In theory, perhaps, we should take this into account. The cost of despatching copies to members and subscribers, however, came to a similar amount, £172. It is clear, therefore, that the price of 2/6 on the cover of the *Naturalist* and the subscription rate to non-members of 30/- (post free) per annum as well as the membership dues of country members allowed no margin for an increase in costs.

It was not to be expected that, in the recent general rise in costs, production of the *Naturalist* would escape. Since August our cost of printing has been increased by about 10 per cent, and the cost of blocks has also risen. It has, therefore, been necessary to reduce the number of pages in each issue from 32 to 24. Cost is not directly proportional to the number of pages, and by this 25 per cent reduction in pages we bring our production cost per issue to a sum slightly below what it was before the increase. It is hoped that the difference will help to meet the increased charge for blocks.

It would be a great pity if we were unable to continue the high standard attained during Mr Norman Wakefield's editorship of the *Naturalist*. We cannot estimate what effect delay in publication may have on the contribution of good material: no author likes to have to wait many months before seeing his work in print.

It is clear that a major decision will have to be made in the near future. We have no margin now.

Vol. 81, No. 8

December 10, 1964

The Victorian Naturalist

Editor: J. R. Hudson, B.Sc., M.R.C.V.S.

Assistant Editor: R. H. J. McQueen, B.Sc., Dip.Ed.

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This photograph of young White Ibis (*Treskiornis molucca*) was taken in the ibis rookeries near Leitchville on October 24, 1964, by Alan Owen.

Bush Brushes

The fox's brush was the traditional trophy of the chase. The Field Naturalist usually returns from an excursion into the bush with a different sort of "tale". If you have one worth mounting and preserving send it to the Assistant Editor, "Victorian Naturalist", 262 Nepean Street, Greensborough, Victoria.

Time or No Time

The following bird notes have been forwarded by Mr. Victor Jacobs, who has recently moved from Doveton to Narre Warren North.

It is a little more than three months since we moved to our new home, and in the activity of laying out a new garden with a view to attracting and sheltering birds in the future, there has not been enough time to do much detailed study. However, after reading the appeal for notes, I sat down to examine in retrospect any "Brushes" I had encountered. What birds had I seen since arriving here? A family of Kookaburras roosts each night in the tall pines nearby, while during the day they forage amidst a large stand of peppermints and stringybarks. Pairs of Flame Robins and Willy-Wagtails have been seen on newly turned garden beds, whilst in the longer grass Crows, White-backed Magpies, Mudlarks, Mynahs and Starlings have searched for food.

In the trees along the roadside the Grey Thrush *Colluricincla harmonica* can be often heard and sometimes seen amidst the leafy boughs. Last weekend a pair of Welcome Swallows spent a full five minutes inspecting our nearly completed garage, no doubt with a nesting site in mind, but as yet no construction has taken place.

Last week I noticed a large bird sitting on a post very near to the house. I fetched the binoculars in time to see it swoop from its perch into a tussock and retrieve some object. When it returned to the post it was quite easy to see that its captive was a large hairy caterpillar. This animal soon disappeared down its gullet, and the bird repeated the process twice more. We had a very clear view of this bird for about ten minutes. It was far from shy, and even when heavy gravel trucks thundered by, it only moved its position a few yards before settling again. Apart from one feature it was identical with the picture of an Oriental Cuckoo *Cuculus saturatus*, shown in N. Cayley's *What Bird is That?* Where Cayley's picture has bars beneath, this bird had a mass of fluffy grey feathers. Does any reader know if the young Oriental Cuckoo has these grey feathers before the bars appear? The bird that we saw certainly looked totally unlike the picture of the Pallid Cuckoo.

Even though identification was uncertain, the sight of this handsome bird and its behaviour did have one effect on me. I made a vow to suffer a few hairy caterpillars rather than spray to kill them and pass the deadly effect on to the unsuspecting cuckoos.

A Bush Stroll

This note has been sent by Mrs Frances Gladstone of Beechworth.

A friend and I recently went on a short walk in the timbered, rocky granite slopes of our nearby hills. The trees are mainly Native Pines (*Callitris endlicheri*) and two species of red gum. *Indigofera australis* was in full blossom, together with some *Acacia buxifolia* and *Pultenaea parviflora* var. *daphnoides*. The bright yellow and red pea flowers of *Platylobium obtusangulum* added a further splash of colour.

Within a half-mile many different orchids were seen. Small patches of *Caladenia carnea*, two flowers of *C.*

patersoni and buds of *C. dilatata* were apparent. Flowers of *Prerostylis nutans* were numerous in small groups, with scattered blooms of *Pt. barbata* and *Pt. pedunculata*. One patch of tall *Pt. longifolia* contrasted with two specimens of *Pt. nana*. Tawny "flights" of *Diuris maculata* and one colourful *Glossodia minor* completed the spectacle.

Several birds were seen during the walk and included a Grey Thrush, Striated Thornbills, one Kookaburra, White-browed Scrub-wrens and a Rufous Whistler hen-bird.

At one point, a Black Snake crossed our path, and a Ringtail Possum was seen in a tree crevice.

Crumpled masses of rock ferns and the moss glowing on the granite was a delight to the eyes. The sun and shadow of the bush was coolly refreshing, spreading beauty in all directions over the living carpet.

Black Cockatoos and Grass-trees

This note has been forwarded by Mr K. G. Simpson of Canberra. Mr Simpson was one of the original members of the Fauna Survey Group and left early this month for a period of research on Macquarie Island.

A paper by P. A. Gilbert (1935) records the Yellow-tailed Black Cockatoo (*Calyptorhynchus funereus* Shaw) extracting beetle larvae (*Cerambycidae, Coleoptera*) from dead flower spikes of the Grass-tree or Blackboy (*Xanthorrhoea* spp.) on the central New South Wales coastal strip ("Movements of birds. Pt. II —The seasonal movements and migrations of birds in eastern N.S.W.", *Emu* 34, 205).

In June 1963, after reading the above record, I examined a large patch of *X. australis* R.Br., situated on the northern slope of a hill at Tidbinbilla, 25 miles west of Canberra. Evidence was found that extensive damage to flower spikes had occurred within the last two or three years. The damage was somewhat similar in appearance to that caused by *C. funereus* in extracting large moth larvae from several species of *Acacia* in the same district, a description of which is to be published shortly (Simpson, K. G., in press—*Emu*).

Lateral bites had been made to the top and bottom of the incision, and long strips of the monocotyledenous plant tissue peeled off vertically to expose the core. Incisions up to eighteen inches long were quite common, and were often seen on different sides and at different levels of the same flower spike. Damage was confined to the region of the inflorescence, there being little infestation of insect larvae below this level. Evidence of the presence of insect larvae is indicated on the dying or dead inflorescence of the year by a copious exudation of clear gum. In 1963 the grass-trees flowered from late October to December. No damage occurred in this patch of grass-trees during 1963.

The damage described above is probably the result of attack by the Yellow-tailed Black Cockatoo, but a considerable population of other parrots and cockatoos is resident throughout the year in the surrounding district, and the possibility that some of these species may be responsible for some or all of this damage must not be discounted as yet. Whether they would adopt exactly the same working method for extracting larvae has not been ascertained. They include the White Cockatoo (*Kakatoë galerita* Latham), Galah (*K. roseicapilla* Vieillot), Gang-Gang (*Callocephalon fimbriatum* Gram), and Crimson Rosella (*Platycercus elegans* Gmelin).

On July 8, 1964, the grass-tree area was again examined, but no new cockatoo damage was found. Two species of insect larvae were obtained from a typical dead inflorescence, and submitted for identification. One species was determined as *Hyaletis lairo* Zell (*Pyralidae, Lepidoptera*), which commonly occurs in grass-trees. The other species was unidentified, but was placed in the family *Cerambycidae* (*Coleoptera*). Both species were quite numerous within the inflorescence, and I believe them to be the larval species sought by *C. funereus* at times. On September 30, 1964, a single flower spike had been freshly stripped, and on October 7, 1964, 11 flower spikes at the southern end of the patch had been torn open in the manner described above. All were spikes from the 1963 flowering, and all had been riddled by insect larvae.

I am indebted to Dr B. Moore and Mr M. Upton, both of the Division of Entomology, C.S.I.R.O., Canberra, A.C.T., for their identifications of the insect larvae collected.

Australian Singing Sands (from the Seashores of Victoria and Tasmania)

—By E. R. Thomas* and I. M. Jones†

Summary

In his book *The Physics of Blown Sand and Desert Dunes*, R. A. Bagnold states that singing sands are rare. We do not agree; we have collected and examined singing sands from many parts of the world. This paper describes and illustrates the phenomena associated with the singing sands of Wilson's Promontory in Victoria and of three beaches in Tasmania. Booming desert sands are also studied.

I. Introduction

Mysterious sounds in desert sands have been known for a very long time; like many other natural phenomena they have been attributed to supernatural agencies. "The old man was quite satisfied to attribute the mysterious noise to the action of the gods whose shrine he tended so carefully," writes Mildred Cable in her book on the Gobi Desert. Bertram Thomas was given a similar explanation when he noticed it in Arabia. This phenomenon was, in fact, noticed and recorded by travellers hundreds of years ago. It happens when sand of certain desert dunes is dislodged and comes flowing down the dune. It was observed most recently by the members of the Cambridge and Sheffield University Expedition to the Tibesti Mountains of the Sahara. Dr. D. W. Humphries, who led the geological section, described the sound as resembling that of the drone of an aeroplane engine. He collected the sounding sand and has very kindly provided us with some of it. We find that it differs from the seashore singing sands; it does not "sing" under the conditions of our experiments. Its histogram and a photomicrograph of the grains are shown later. (Fig. 1 & 9.)

It seems clear that the singing of the seashore sands to be described in this paper differs in character from the booming of the desert sands. This seashore sound undoubtedly gave Squeaky Bay, on Wilson's Promontory, its name; for the sound is produced when the sand is struck by the foot. Hugh Miller, the geologist, gave such sands the name of "singing sands" when he described his experience at Laig Bay, in the Island of Eigg, in Scotland. This was in the *Cruise of the Betsy*, published posthumously in 1858. He wrote: "I became aware of a peculiar sound that it yielded to the tread as my companions paced over it. I struck it obliquely with my foot where the surface lay dry and incoherent in the sun and the sound elicited was a shrill sonorous note . . . . ." He adds that this was a phenomenon "which some of the greatest masters of the science (of acoustics) have confessed their inability to explain." Cecil Carus-Wilson found a way of making such sand sing in the laboratory. He placed it in a cup or an evaporating basin and struck it with a pestle or some similar object. In this article in *Nature* in 1891 he states that the grains of these singing sands were rounded, polished and free from fine fragments and were all within a cer-

* Physics Dept. † Geology Dept. University of Newcastle Upon Tyne, England.

tain narrow range of size. He added that the ability to sing was destroyed by constant pounding, but restored after the fine fragments produced by the pounding were removed.

In 1902 Professors Poynting and Thomson in their textbook on sound explained the phenomenon as due to the change of certain masses of sand "from positions of one minimum volume to another." They indicated a certain area of beach at Barmouth, in North Wales, where some of this sand was to be found. Some years later, in 1909, one of us examined this sand to discover how the pitch of the note varied when the conditions were changed. There appeared to be a definite relation between the pitch of the note and the size of the vessel in which the sand was struck; the larger the vessel, the lower the note. It was also found that singing sands occurred in other parts of the beach, and indeed, on many parts of the coast of Wales. (Thomas, *Nature* 1911.)

No further work appears to have been done on this problem until 1937, when K. Kurihara studied the singing sands at Kotogahama and Oshima in Japan. He was able to compare these sands with those of the Island of Eigg and, in general, he agreed with the conclusions of Carus-Wilson. Thanks to the kindness of Dr. Shimakawa, of Tokyo, we have been able to study some of these Japanese singing sands. In 1951 Dr. M. Hashimoto showed that there was a marked difference in the coefficient of friction between the singing sands of Kugunarihama, Kotoikibama and Kotogahama and the ordinary sands of Kounda and Yura. In a paper in 1952, T. Fugita and S. Tsachihasi stated their opinion "that the sound is caused when the sand is compressed because friction between the grains creates a step by step change in the layers so that the air in the interspace between the grains is expelled suddenly to produce the sound." We do not agree with this conclusion.

Work on this problem was resumed in Newcastle in 1960 with the cooperation of A. E. Brown*, W. A. Campbell† and D. A. Robson‡. Singing sands were found in many parts of the coast of Northumberland; they all had a high degree of uniformity of size of grain—they were "well-sorted." This was found to be true of all the singing sands we investigated; those of Japan, Russia, Norway, Poland, Africa, U.S.A., France, Belgium, many parts of the British Isles—and the Australasian sands which are the subject of this paper.

While they all have a high degree of uniformity of size of grain, they are not, as had been supposed, all rounded. As will be seen from the photomicrograph (Fig. 4), the Norman Bay sands, which sing well when the large amount of shell present has been removed, are distinctly angular. So are the Morar singing sands of Scotland. We find that the uniformity of size of grain is the important factor; the greater the uniformity of size the better is the note produced.

(For purpose of comparison we have included the photomicrograph and histogram of a non-singing river sand. (Fig. 8 and 16.)

We have examined the effect of the presence of slight traces of moisture on the note of the Squeaky Bay sand and we have produced a note from sand lying under a layer of water.

It is not easy to say what happens when the sand sings. As already indicated in Part II of *Musical Sand*, we

* Imperial College, London.
† Chemistry Dept. ‡ Geology Dept. University of Newcastle Upon Tyne.

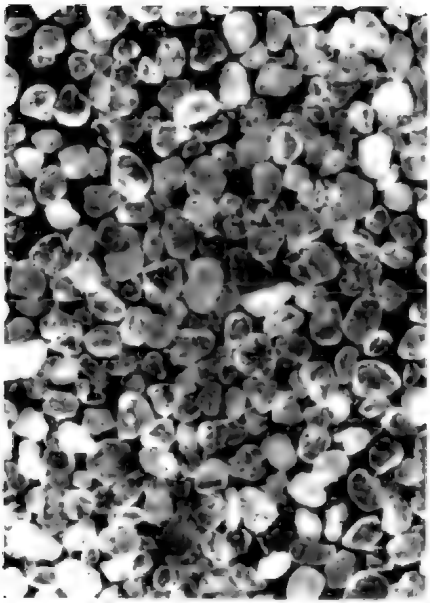

FIGURE 1—Photomicrograph of booming sand from Tibesti Mountains, Sahara.

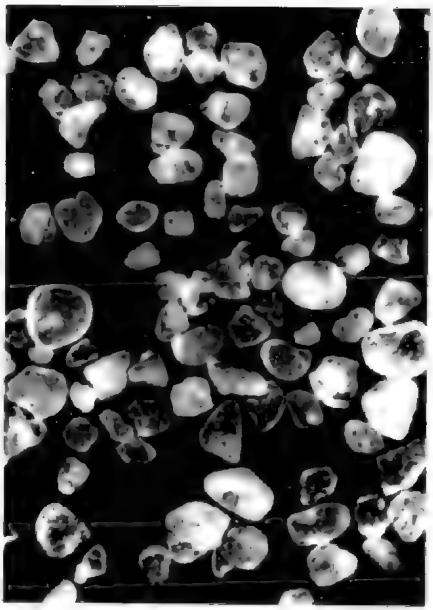

FIGURE 2—Sand from Squeaky Bay.

FIGURE 3—Sand from Sealer's Cove.

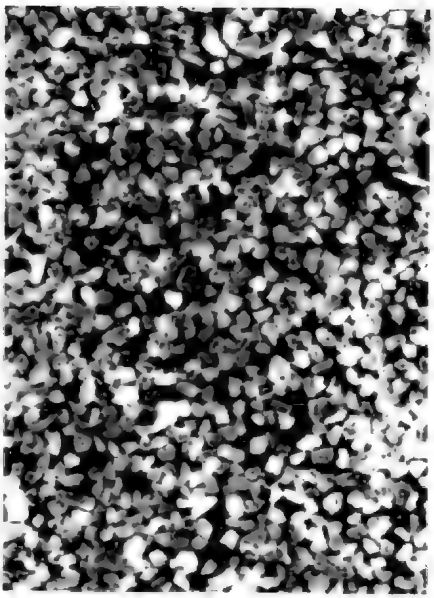

FIGURE 4—Sand from Norman Bay.

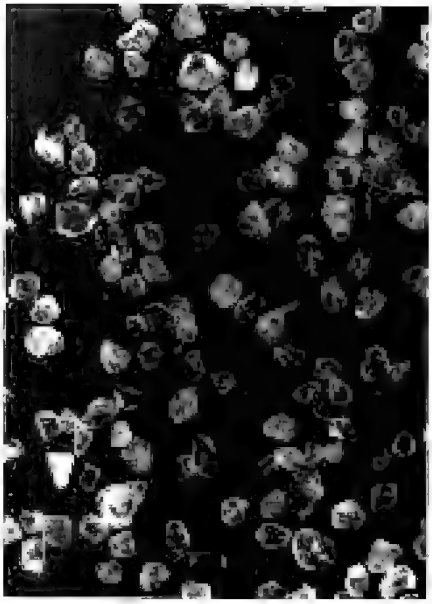

FIGURE 5—Sand from Binnalong Bay.

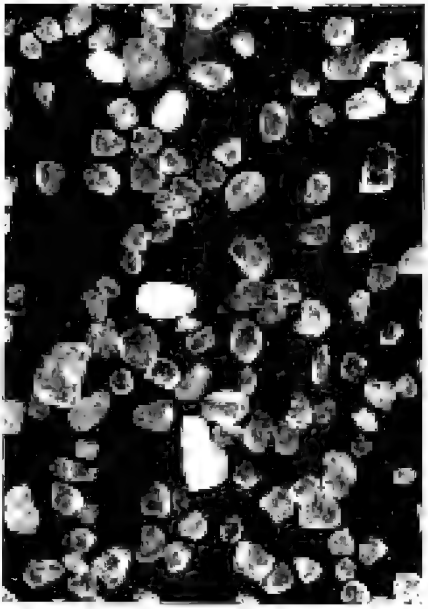

FIGURE 6—Sand from Falmouth, near St. Mary's.

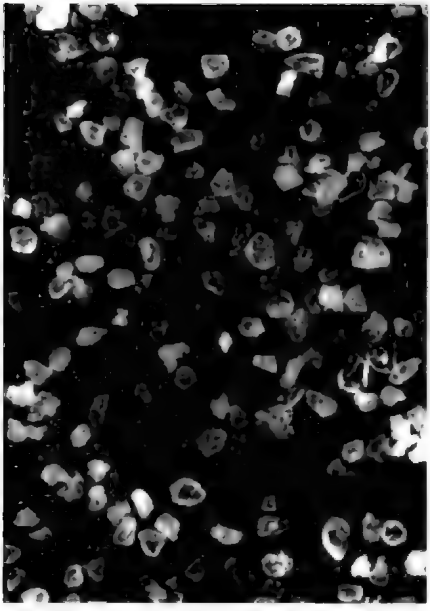

FIGURE 7—Sand from Pirates Bay, Eaglehawk Neck.

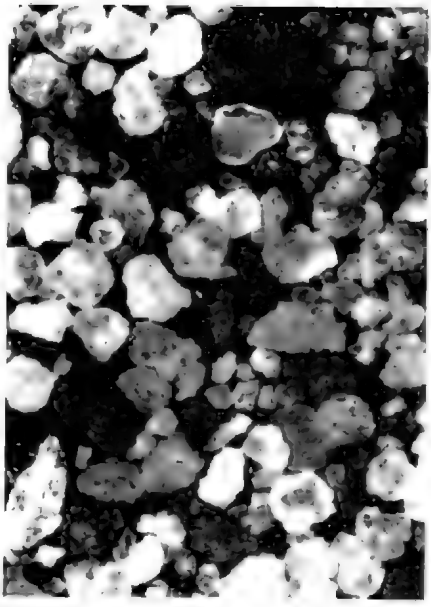

FIGURE 8—Sand from the River Lyon.

do not agree that the sound is caused by a puff of air between the interstices of the sand. We find that sands of very different size of grain give, under the same experimental conditions, substantially the same notes.

We think that the idea expressed by Poynting and Thomson mentioned earlier in this paper is more likely to be correct; that the sound is caused by the passage of small compacted masses of sand over one another when the sand is struck. The uniformity of size of grain which we find in all singing sands makes this possible.

But this phenomenon and that of the desert booming sands both await a fuller explanation.

II. Experimental

The sound was produced by striking the sand in an evaporating dish with a rough-ended pestle. For most of the experiments a dish of 8·5 cms diameter and a pestle 3·5 cms in diameter were used. It requires a little practice to produce always exactly the same note. A very slight difference of pitch is produced according to the speed with which the sand is struck; if the sand near the side of the vessel is struck (confining a smaller amount of sand) a slightly higher note is produced. With practice we were able to produce a relatively consistent note, and this was recorded on a tape-recorder. This recording was used in some of our experiments.

It is well known that damp sand does not sing, but we found that Squeaky Bay sand, with only 1·7% of moisture content does sing; it gives a note about one octave higher than that of the dry sand. (Fig. 17)

The degree of uniformity of size of grain was measured by shaking a quantity of the sand on a range of sieves in a vibrator for a quarter of an hour. The amount of sand remaining on each sieve was weighed and the histograms (Figs. 9-16) show the percentage by weight of the different sizes of grain.

It was noticed that two of the three specimens of Tasmanian sands sang well after the shaking in the vibrator. The third (from Pirates Bay) did not. Unlike the other two, this sand contains Pyroxene; it is not unlikely that with its ready cleavage it is ground up to produce dust which is known to inhibit the singing of the sand.

III. Results

The results are given in the accompanying photomicrographs and histograms. These illustrate samples of sands from—

Tibesti Mountains, Sahara;
Squeaky Bay, Wilson's Promontory;
Sealer's Cove, Wilson's Promontory;
Norman Bay, Wilson's Promontory;
Binnalong Bay, St. Helens, Tasmania;
Falmouth, near St. Mary's, Tasmania;
Pirates Bay, Doo Town, Tasmania.

In addition a non-singing sand from the River Tyne is included for comparison with the others.

The graph gives 1/3 Octave Analysis of the notes of dry and moist sand from Squeaky Bay, and the photograph of a Cathode Ray Oscillograph trace is that of a note obtained from sand under a layer of water.

Acknowledgements

We are much indebted to Dr. J. A. L. Matheson, Vice-Chancellor of Monash University, who suggested this investigation, and Professor H. C. Bolton, of the Physics Department, and Professor A. J. Francis, of Melbourne University, who made it possible. We also thank Dr. L. Molyneux for the Cathode Ray Oscillograph photograph, and Pro-

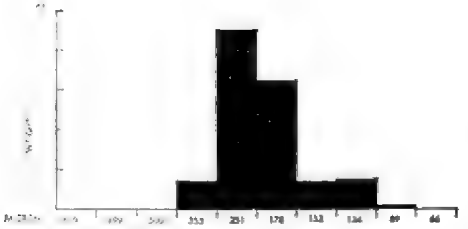

FIGURE 9—Booming sand from Tibesti Mountains.

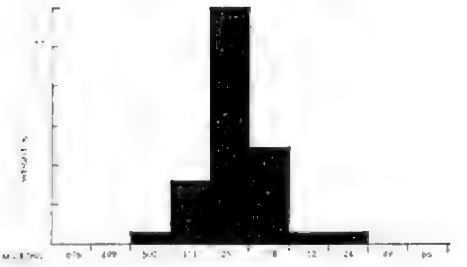

FIGURE 10—Sand from Squeaky Bay.

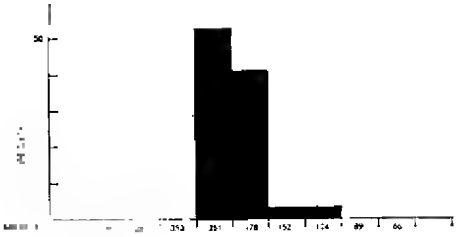

FIGURE 11—Sand from Sealer's Cove.

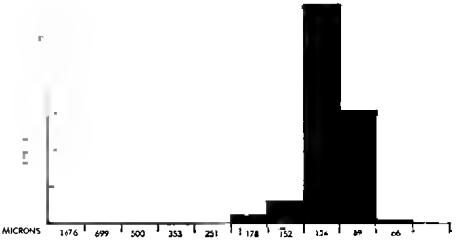

FIGURE 12—Sand from Norman Bay.

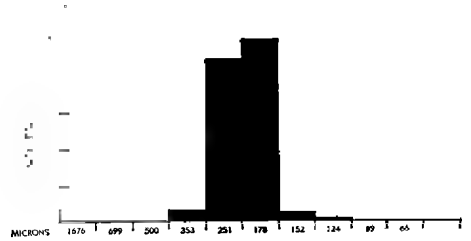

FIGURE 13—Sand from Binnalong Bay.

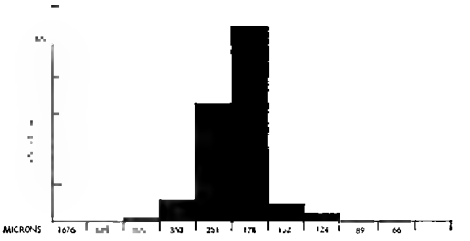

FIGURE 14—Sand from Falmouth.

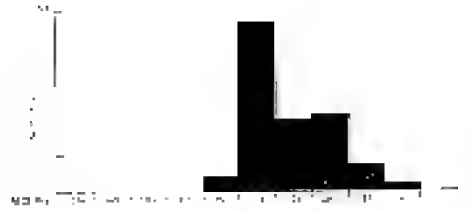

FIGURE 15—Sand from Pirates Bay.

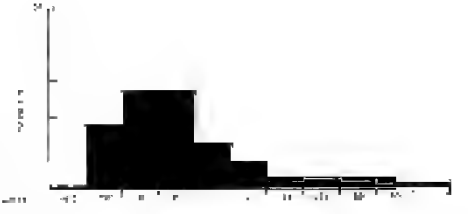

FIGURE 16—Sand from River Tyne.

Histograms of proportions by weight of grains of different sizes.

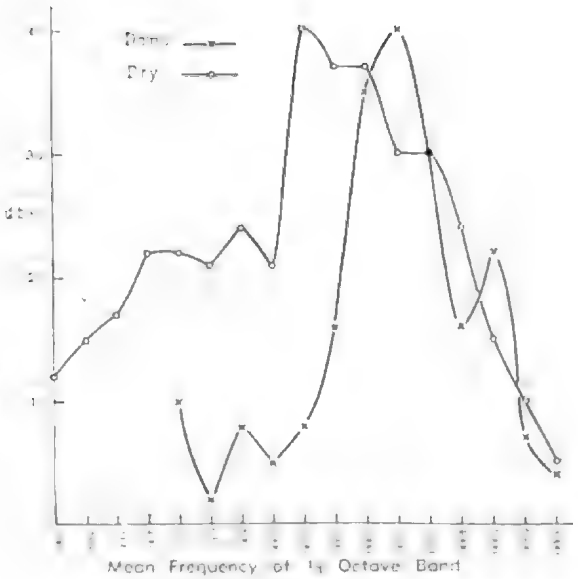

FIGURE 17—⅓ Octave Analysis of moist and dry sand from Squeaky Bay.

fessor S. K. Runcorn and Professor T. S. Westoll for their continued interest in our work.

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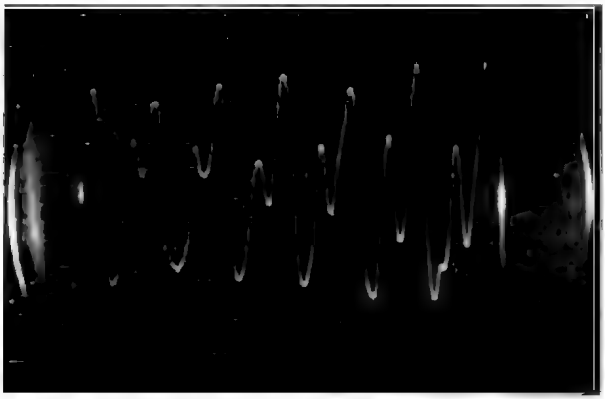

FIGURE 18—Cathode Ray Oscillograph trace of note produced by sand lying under a layer of water.

South African Bone-seed Becoming a Curse

By Jack Wheeler

During the period of early settlement, Australia soon became the new home of a great variety of exotic plants.

Where conditions were favorable, they flourished and spread rapidly. One exotic, *Chrysanthemoides monilifera*, South African Bone-seed, first cultivated in the Melbourne Botanic Gardens in 1858, however, never became a serious menace until well after the turn of the century.

In other States, Bone-seed was first noticed in New South Wales in 1893, whilst in South Australia it became well established in the Mount Lofty Ranges in 1909, where it soon became a pest. It became established at Cheltenham in 1908 and Brighton Beach in 1910. Ten years later it was spreading rapidly along coastal regions from Point Lonsdale to Lorne, and about the same time from Frankston to Arthur's Seat, on the Mornington Peninsula.

Of the inland areas where it has become established, the greatest concentration in this State is at the You

Bone-seed bushes on western slope of Flinder's Peak, October 1964

Photo: Dick Hudson

Yangs, 14 miles north of Geelong, where it was first noticed on the western slopes in 1950. It has spread so extensively that today the whole of the western slope of Flinders Peak is covered and northern and southern slopes are being threatened. In some areas it has become so concentrated as to choke out all other vegetation and cause trees to die.

Why then has this plant "exploded" to such an extent in recent years, whilst prior to 1900 it was of no consequence. Was it that the plant was never allowed to spread beyond its early establishment, or was it kept in control by the rabbit (it is a plant edible to animals) and, since the great effort to eradicate the rabbit, has spread rapidly ?

Following an investigation into Bone-seed and consultation with the Noxious Weeds officers of the Lands Department, the Scenic Reserves Committee of the You Yangs has made the following decisions:—

(1) To step up planting of native shrubs and trees in threatened areas.
(2) To establish experimental plots to study growth and control.
(3) To request the Forests Commission to consider control methods.
(4) To encourage the pulling of Bone-seed seedlings in less infested areas.

At the present time Bone-seed is no immediate threat to pastoral land, and for that reason there is little likelihood of the plant being declared a noxious weed.

Since this investigation three thousand native trees have been planted by the Bird Observers' Club and the Geelong Field Naturalists' Club. Pulling of seedling plants has also been carried out, and a two-hour effort by the Bird Observers' Club, during which each person was handed a card to record his or her effort, some 9300 plants were pulled between the picnic ground and the Big Rock. Other organisations have also taken part, with the result that some areas are now clear of the pest.

In South Africa, Bone-seed is widely distributed, occurring along the East Coast as far inland as the Drakensberg. It is one of the dominants of the sea-shore dune-scrub from Port Elizabeth northwards to Kosi Bay. There it is not aggressive, and except for the dune-scrub is nowhere very abundant. On account of its ready and heavy seeding there must be some factor there that keeps it in control. The Red-wing Starlings feed readily on its fruits, but no information is available as to whether the seeds are destroyed or not. Control may be effected by some other biological means. Stock also eat it readily in South Africa.

Information has recently been received from America to the effect that the fruits of Bone-seed have produced a valuable drying oil, so there may be some possibility of control in this field.

In conclusion, I appeal to all naturalists visiting the You Yangs to acquaint themselves with Bone-seed and, whenever practicable, share in this campaign of "pulling" until a more effective measure of control is devised. Following rain and when the soil is moist, the shallow-rooted plants are easily pulled, and if the soil is shaken from the roots the plant will soon die and not re-root.

A careful watch is necessary to see that this plant does not spread to other Reserves and National Parks and, if found, every effort should be made to eradicate it before it becomes as well established as it is in the You Yangs region.

Bird Hybrids—A Remarkable Problem

—By A. H. Chisholm

Claims concerning supposed hybrids of a very remarkable nature—between the Superb Lyrebird and the Common Fowl—were put forward from the early 1890's onward, both in Melbourne and abroad, and some of these were discussed in the *Victorian Naturalist* by Major H. M. Whittell and myself during 1946-51.

Now, on an international basis, the subject has been revived—and the revival has produced some curious facets.

In brief, an interested American has directed our attention to relevant information contained in a journal published in Vienna 72 years ago, and, through that hint, we have not only become aware of an earlier and more detailed report than any previously known, but have learned that this statement was actually published, in 1892, twice in Australia as well as once in Austria.

Whittell opened the discussion in the *Vict. Nat.* during 1946 (June) by quoting from the *Avicultural Magazine* (London) of 1904 a letter in which A. W. Milligan, a Victorian ornithologist, stated that, although he was "never able to rear *Menura superba*", he did have "hybrids between the Lyrebird and the common fowl" and exhibited them at a Victorian poultry show some years previously. To this letter, so tantalizing in its brevity, the editor of the *Avic. Mag.* (D. Seth-Smith) attached a comment on the "most extraordinary nature" of the record (relating to birds of different Orders), and said he hoped to hear more on the subject.

Another published reference to the matter discovered by Whittell (1948) was in a paper by J. G. O'Donoghue in the *Vict. Nat.* in 1914. The writer said that when Milligan lived at Traralgon he "had in captivity several hybrids, a cross between the male Lyrebird and the domestic fowl", and these were awarded a special prize when exhibited at a poultry show in Melbourne. "They were fowl-like in form but built on a somewhat smaller scale . . . ." It was added that Milligan "began a series of experiments with these hybrids, which bred freely *inter se*, and had successfully reared two generations when he left for Western Australia"—a statement that does not harmonize with Milligan's own admission that he was never able to rear a Lyrebird.

Meanwhile, I quoted in the *Vict. Nat.* (1946), as a footnote to Whittell, a paragraph that appeared in the Melbourne *Argus* of November 25, 1921, to the effect that W. R. Pennycook, of Bendigo, recalled having been told of Lyrebird-fowl hybrids occurring some years previously, near Twofold Bay. The site was a lonely farm on which a fine male Lyrebird often visited the fowl-yard. The chicks were said to be more like Lyrebirds than fowls. Pennycook did not see the birds; he was told they had been sold to a travelling dealer.

A little later (May, 1947) I wrote

in the *Vict. Nat.* another paragraph on the subject dredged from the Melbourne *Argus*, supposedly in 1907, but actually (as I have since learned) on March 6, 1908. It was to the effect that R. Davis, of Walhalla, claimed that a male Lyrebird "paired with a black Spanish hen, which laid away in the scrub and brought out a clutch of chickens. When they grew up they resembled a Lyrebird in every way excepting the tail of the male Lyrebird".

The final contribution to the series was by Whittell, who had noted in *The Emu* for 1909 that C. W. Maclean (then Chief Inspector of Fisheries and Game) had exhibited at a congress of the R.A.O.U. "a rough skin of an apparent hybrid between a Lyrebird and an Andalusian Fowl". That was all; there was no comment. As Whittell remarked in the *Vict. Nat.* (February, 1951), ornithologists of the time were very remiss in not attempting to solve this puzzle. Milligan was then in Perth, but he was a member of the R.A.O.U. (an original, in fact) and should have been invited to relate his own experience on the Basis of Maclean's specimen, which, by the way, may have been one of the Walhalla birds.

There, save for a passing reference I made to the "puzzling" nature of the problem in October, 1953, the matter rested for thirteen years. It was then revived, again in the *Vict. Nat.* (February, 1964) through the medium of a letter from Keith P. Hertzog, of the University of Pennsylvania.

Mr. Hertzog has done us a service; for, after quoting the references given above, he added to them by drawing attention (through the medium of overseas writings on hybridism) to a letter by Milligan of which we knew nothing. It was contained in a journal published in Vienna, *Mittheilungen des Ornithologischen Vereines*: in 1892 (April 16), and it had been translated by Otto Finsch from a letter published in the Melbourne *Argus*.

Hertzog gave only a suggestion of the letter's contents, but his reference was sufficient, the fortunate fact being that the relevant issue of the Vienna journal was found to be available in the library of the Australian Museum, Sydney.

It appears from this reprint that Dr. Finsch received a copy of Milligan's letter from some "unknown friend" in Australia, and he thought the report so remarkable, if not incredible, that it merited republication in the Vienna *Records*. Luckily, Finsch added the date of the letter's appearance in the *Argus*—February 15, 1892—and so it was a simple matter to read the statement in the Public Library of New South Wales, though in fact it was in an obscure part of the paper (page 10).

Moreover, I found that the letter had been reprinted in the *Australasian* (weekly companion of the *Argus*) on February 20—just squeezing ahead of lengthy reports of the murderer Frederick Deeming.

Here is the text of the letter:

PECULIAR HYBRIDS

To the Editor of The Argus

Sir,—Possibly the following description of a remarkable hybrid, the result of a cross between the male lyrebird (*Menura superba*) and a common hen of a lightish colour, may prove of interest to some of your scientific readers. The birds, two in number (male and female) are now in my possession, and were captured in one of the scrubs of this district:

Male Bird—Age apparently three months; plumage loose, thick, and hair-like, covering the whole of the body; prevailing colour brown, blotched with white; end of neck-coverts tipped with reddish-brown; body resembling fowl's but more slender and lean; head re-

sembling cockerill of common fowl in shape, with red comb; mandibles resembling fowl's, save the tip, which is more hooked and incised; no bristles on base of beak as in lyrebird, nostrils same as in fowl; no partial covering of skin on nostrils as in lyrebird. Wings rounded, consisting of nine quills, first five graduated and all ending in hair-like brushes. Tail-feathers hair-like, but probably will develop as in male lyrebird; rump more enlarged than in common fowl; tarsi resembling lyrebird's in colour but thicker in form; skin thick and leathery, and mahogany-coloured.

Female Bird—Chicken, apparently six weeks old; plumage loose, thick, and hair-like, as in male bird; prevailing colour blacky-brown, with feathers ferruginously tipped.

I have not heard any sound from them to indicate that they inherit the imitative faculties of the lyrebird, but it is within the region of possibility that they may yet develop them.

It is quite possible that hybrids of this kind may be known to ornithologists, but if so I have never seen them described, and I endeavour to keep in touch with ornithological matters.—

Yours, etc., A. W. MILLIGAN.

Bonnie Doon, Traralgon, Feb. 4.

The first reflection arising from this letter is that it relieves Milligan's reputation of the reproach that his only published reference to his alleged hybrids was the scanty statement of 1904 to Seth-Smith. Nevertheless, and although he recorded considerable detail concerning his birds, he was neglectful in not stating how and when and by whom they were obtained; for, apparently, he did not, as Hertzog supposes, capture them himself.

Also, he might well have remarked on the obvious fact that his two chicks (one aged three months and the other six weeks) came from different clutches; and, as well, he could reasonably have pointed out that the chicks were, as their ages indicated, hatched later than the normal breeding period of the lyrebird.

Above those considerations, there remains the puzzling fact that Milligan, while recognizing his supposed hybrids to be "remarkable", allowed his claim to rest only on a letter to a Melbourne newspaper of 1892 and a brief reference in a semi-private letter to England in 1904.

Such neglect could have been understood in the case of a casual observer, but Milligan was a keen ornithologist and a competent writer—witness his various papers in the *Vict. Nat.* and *Emu* during 1901-13—and, as I recall from a meeting with him in youthful days, he was also a very agreeable man. By occupation he was, I think, an accountant, though he may have been otherwise employed when in 1892 (then aged 34) he was living at Traralgon. He died, in Melbourne, in 1921.

Incidentally, it is also curious that A. J. Campbell made no allusion to his friend Milligan's alleged hybrids in the lengthy article on Lyrebirds contained in his *Nests and Eggs* (1900). That omission, however, may have been merely fortuitous—Campbell was probably so intent on recording the number of Lyrebirds' eggs he had obtained, from time to time, that he forgot events that really mattered.

Finsch showed more discernment. A distinguished biologist of his time, he collected birds in Australia in 1881 (he visited Sydney in May of that year), and was afterwards an important figure in the exploration of New Guinea, as well as a public representative of Germany in the Pacific. It was, no doubt, his interest in Australian birds, plus his astonishment at the nature of the supposed hybrids, that caused him to reprint Milligan's letter—and so save it for posterity.

Well, what now?

Various inquiries made of late have

not been profitable. These have included material I wrote in the Melbourne *Age* (June 19) and the *Sydney Morning Herald* (July 4) in an attempt to find some bushman who might have knowledge of one or another of the various cases. They have also included inquiry at the National Museum (Melbourne), but, although both Milligan's birds and Maclean's specimen should have finished up there, none of them appears to have done so; at any rate, no record of them can be found.

As to the validity of the claims in the light of published material, it is interesting to find that although various writers overseas have been largely sceptical concerning such a remarkable cross, Hertzog declares that its "extreme improbability is perhaps not as great as some ornithologists might think". To ridicule the claim on a perfunctory basis, he suggests, is neither scientific nor fair.

Here, perhaps, it is not inappropriate to mention that in his *Birds of Jamaica* (1847) the ornithologist P. H. Gosse records that, in spite of initial scepticism, he could not doubt the authenticity of many reports of Aura Vultures mating with domestic hens. It was, he says, a "curious and unaccountable fact" that male Vultures had often made salacious and furious attacks on domestic black hens—always black hens—and thereby had injured the fowls so severely that most of them died soon afterwards.

That matter aside, I personally remain puzzled by certain loose ends in the Lyrebird-Fowl case, as well as by the astonishing nature of the alleged cross. Nevertheless, it seems to me that it would be presumptuous to suppose that several men, each functioning independently, must all have been wrong in reporting the existence of hybrids between Lyrebirds and fowls.

ADDENDUM

Another puzzle concerning supposed hybridism among birds is discussed by the writer in *People* (Sydney) for Nov. 4, 1964. The central figure in this case is a Queensland bowerbird which was named (1867) *Prilonorhynchus ravensleyi*, but which has generally been regarded as a cross between the Satin and Regent Bowerbirds. It is mentioned in the article that European records have shown that in such cases the male is not necessarily the larger bird, and, as an odd fact, it is also stated that, according to European records, males are usually in a marked majority among various hybrids—twenty to two in one instance.—A.H.C.

AFFILIATED CLUB

Ringwood F.N. Club

Mr. W. King is President of this active Club and Mr. F. Flentze continues as Secretary.

Field Naturalists Club of Victoria

General Meeting—November 9, 1964

There was a good attendance of members and friends when the President opened the meeting with a welcome to all. After the approval of the minutes, Mr Coghill made a number of announcements. The 1965 Nature Show would be held in the Lower Town Hall on September 6-8 next. Mr R. Condron had consented to become the Assistant Secretary. Community Aid Abroad was arranging a Nature Study Exhibition on November 24-25 at the Methodist Church Hall, Mitcham Road, Mitcham, to raise funds for the work of the organization. The post office had returned copies of the *Vict. Nat.* addressed to Mrs. C. Langley, 101 Cotham Street, E. Melbourne, and Mr Noel Dawson, 64 Park Street, W. Brunswick; anyone knowing the present address of these members was invited to notify him.

Mr Houghton then asked Mr J. H. Willis to present the 1963 Natural History Medallion to Mrs Thistle Y. Stead. Mr Willis said that it gave him very great pleasure to undertake this task. For three reasons, this was an important occasion. It was the first occasion on which anyone had come to Melbourne from another State to receive the medallion, it was only the second time that the medallion had been awarded to a woman, and Mrs Thistle Stead was a member of the F.N.C.V. Mr Willis said that it was unnecessary to refer in detail to Mrs Thistle Stead's achievements, as they would be found on p. 102 of the November issue of the *Vict. Nat.* Endowed with great literary and organizing ability, she had, for many years, laboured hard in the cause of preservation. Mr Willis then presented the medallion to Mrs Thistle Stead to the accompaniment of applause from the audience.

Mrs Thistle Stead, in thanking Mr Willis, said that she had once handled the medallion presented to her old friend, Mr J. M. Black of South Australia, and had never imagined then that she would one day be the recipient of one herself. She stressed the urgency of preservation now before it was too late, and concluded by once again thanking the Committee for honouring her and Mr Willis for making the presentation.

A number of members spoke to exhibits on the table. Mr Ros Garnet referred to a small bunch of flowers from the Crooked River area of eastern Victoria. The Freestone Creek Highway was a magnificent scenic road. Miss Elder mentioned a Narrow-billed Bronze Cuckoo picked up dead. Mr Hammett had brought specimens of *Grevillea tripartita*, *G. aspleniifolia*, *Diplolaena grandiflora*, *Darwinia meissneri* and others. Other exhibits were two aboriginal spearheads from near Broome, cats' eyes from Noumea, and a picture made from pieces and chippings of opal shown by Miss Edith Raff, shells from Wilson's Promontory brought by Mrs M. North, trilobites and gemstones from New South Wales exhibited by Mr E. Francis, and a named series of plants from the Brisbane Ranges. F.N.C.V. microscopes gave enlarged views of a jumping spider and of diatoms on weed from Albert Park lake.

Mr. W. Woollard described a lovely stretch of wildflower country that existed in the Anglesea area beyond the coalmine and inwards old Wensleydale. There were acres of Smokebush and a good selection of orchids. Up to 19 kangaroos could be seen on the golf links and some were remarkably tame. Mr Willis reported a telegram from Mr Cliff Beauglehole announcing the first discovery of *Utricularia violacea*, Violet Aprons, in Victoria. Miss I. Woollard advised that Little Wattlebirds had now spread into Croydon gardens, from which they were driving many small species of birds. Mr Jim Baines expressed thanks of members to the President for leading the Cup Day excursion to the Brisbane Ranges, and to Mr Bruce Fuhrer for the Botany Group excursion to Mt. Blackwood. Both were most enjoyable outings. Mr Morley showed two forms of *Crataegus*, introduced to Australia, and described the wildflowers composing a spring scene in the English county of Norfolk.

The subject for the evening was "Habitat Conservation". Mrs Thistle Stead listed and described the main communities of plants found in Australia, rain-forest, high mountain associations, sclerophyl forest, savannah grassland, desert and mallee, etc. A series of excellent slides was shown to illustrate these

different types of vegetation. She mentioned various features of the different species that fitted them for their environment and said that lack of knowledge made it difficult to work out a programme of conservation.

Mrs Thistle Stead described small successful efforts to develop reserves in New South Wales, and gave a brief account of the work being undertaken and the difficulties being encountered in the David Stead Wildlife Foundation Reserve, "Wirrimbirra", between Picton and Mittagong.

The President thanked Mrs Thistle Stead for her instructive and informative talk. He announced that Mr Bruce Fuhrer would fill the vacancy on Council caused by Mr Bob Condron becoming Assist. Secretary, and that congratulations had been sent to Mr Vic Miller who had recently celebrated his 90th birthday.

The new members listed on page 211 of the *Vict. Nat.* were elected.

Botany Group—October 8, 1964

Mr Bruce Fuhrer occupied the chair and welcomed Mrs Monahan, who spoke on the flora of New Zealand and compared the vegetation of that country and that of Australia; 250 species were common to the two countries. Two notable exceptions were that New Zealand had no eucalypts and no acacias.

Mrs Gillies reported on the recent excursion to King's Falls, Rosebud, and stated that the party had seen, in addition to many flowers in bloom, two Black-tailed Wallabies.

Mr Dawes mentioned a recent trip to Labertouche where he had seen *Boronia barclayana* in flower.

Excursions were arranged to Monbulk and Blackwood.

Microscopical Group—August 19, 1964

About thirty members attended this meeting, which was chaired by Mr F. LeMaistre.

Mr D. McInnes discussed with the group arrangements for the Nature Show; these included advertising, distribution of leaflets and organization of work rosters with particular emphasis to the "Microscope Exhibit" which would consist of 10-12 microscopes.

Mr P. Genery gave the group an illustrated talk on the "Life and Work

of Robert Hooke", a man who did an enormous amount of most original scientific work with a great deal of emphasis on experiments. Robert Hooke recognized some three centuries ago that the answer to any problem can only be found by trying it out in practice rather than the practice of his time of arriving at the answer by a process of debate. At the present day he is only remembered by the law which bears his name, yet many other things which he discovered and are of a more profound nature are hardly ever attributed to him. He invented a clock-driven telescope, the spring-driven movement of a pocket watch, and even designed and helped to build many churches and public buildings, but it is his work in the field of microscopy, which earned him the name of "the Father of English Microscopy", which interests this group.

The speaker then, with the aid of the Club's epidiascope, projected on to the screen many line drawings of specimens as seen and sketched by Hooke during the reign of James II, many of which are as accurate in detail as anything that can be seen today.

His work certainly showed all the signs of genius and is rarely, if ever, given due recognition.

Microscopical Group—Sept. 16, 1964

Nineteen members and visitors attended this meeting, which was chaired by Mr E. LeMaistre.

Mr D. McInnes reported that the Microscopical Group's exhibit at the Club Nature Show had been most successful; people had queued up three deep to view the specimens which consisted of sea-urchin spines, rock sections and pond life. He also reported that he had attended the Wild Microscope Exhibition at which there had been a most extensive array of microscopes, some equipped with a revolving condensing system which included phase contrast, dark ground and bright fields all built into the one mounting.

The rest of the evening was set aside for the discussion of the use of the M40 and M19 telescopic rifle-sights which could be converted easily into stereo binocular microscopes. Mr W. Woollard explained that the M40 variety produced an instrument of very low power (12.5X with a 10X eyepiece) and could be bought cheaply in quantity at present, but he suggested a method of increasing its power. All that was required was a pair of good eyepieces, some kind of stand to support the converted sights, the removal of one lens of the sights, and the arrangement of the optical axes to give the stereo effect. Several members had their own home-made binoculars in use showing various specimens.

Mr. W. Evans displayed to the group his home-made micro light-meter which he made for a few pounds to a circuit designed by Mr W. Woollard.

Nine microscopes were in use displaying a variety of specimens, including sponge-spicules, sand-grains and some aquatic insect larvae (*Stratiomys* and *Mochlonyx*).

Geology Group—November 4, 1964

Twenty-five members and visitors were present, with Mr. L. Angior in the chair.

Mr R. Davidson reported on the excursion to the Australian Cement Quarry at Fyansford, Geelong, on Sunday, October 11. Fifteen persons attended and before proceeding into the quarry, Mr Davidson explained the geology of the area. The Batesfordian impure limestone makes an excellent base for cement and is highly fossiliferous. During the day sharks' teeth, elephant-tusk shells, sea-urchins' spines and foraminifera were collected. The manager and staff of the quarry were also most helpful. The secretary made brief mention of matters of geological interest seen on a visit to Enfield and Berringa, near Ballarat. Members of the Group who attended the club's excursion to Wilson's Promontory were able to make observations of the structure of the area, including the granite, the subsiding coast-lines, and the sand-drift section connecting the promontory proper to the mainland.

Syllabus items and other aspects of the Group's activities were arranged for 1965.

The subject for the evening was "Building Stones" by Mr R. Hemmy. Owing to the illness of the speaker and his inability to attend, arrangements were made to show his pictures and explain them by the use of lecture notes. The pictures showed many buildings still standing, and many since demolished, which had been constructed of a wide variety of stones, some quarried locally

and others imported from overseas. It was decided to ask Mr Hemmy to give his talk again early in 1965, when a more detailed report could be made.

Exhibits: Fossil coral from Lilydale Limestone Quarry, gypsum and satin-spar from South Australia, quartz pebble with seam of opal from Andamooka, South Australia (Mr Don Dangerfield); garnets in granite from Wilson's Promontory, tourmaline from Mt. Oberon (Wilson's Promontory), various pebbles from beach at Walkerville, Waratah Bay; exhibit comprising specimens, map and comprehensive report on the Black Rock and Beaumaris area which won a fifty pounds bursary in the Talent Search at the recent Science Exhibition (Master R. Whatmough); agatized wood containing opal of Cretaceous age from White Cliffs, N.S.W. (Mr R. Davidson); pyrites crystals in slate from Old Birthday Mine, Berringa (Mr T. Sault); marble slab from Turkey, chert from Colbinnabin Range near Heathcote (Mr L. Angior); slides under the microscope showing Lepidoclina Foraminifera from Fyansford Limestone Quarry, calibration slide enabling measurements of 1/800 of an inch to be made with the club's microscope (Mr D. McInnes).

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Magnificent stand of White Mountain Ash, *Eucalyptus regnans*, in the Marysville State Forest

FORESTS COMMISSION VICTORIA

. . . . . preserving the beauty of our forests for your enjoyment.

Vol. 81, No. 9

F.N.C.V.

January 7, 1965

The Victorian Naturalist

Editor: J. R. Hudson, B.Sc., M.R.C.V.S.

Assistant Editor: R. H. J. McQueen, B.Sc., Dip.Ed.

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The cover photograph by David Fleay illustrates a female Ring-tailed Possum (*Pseudocheirus laniginosus*) trying to persuade its 10 weeks old youngster to return to the pouch. The photograph first appeared in February 1928 in the *Victorian Naturalist*, **44**, 280.

Bush Brushes

The fox's brush was the traditional trophy of the chase. The Field Naturalist usually returns from an excursion into the bush with a different sort of "tale". If you have one worth mounting and preserving send it to the Assistant Editor, "Victorian Naturalist", 262 Nepean Street, Greensborough.

Burrowing Wasps

The following account of wasp activity has been sent in by Mrs E. G. Bedggood of Ballarat.

During late January 1964 at Anglesea, I observed approximately twelve solitary wasps carrying out the whole of their burrowing activity.

During digging operations, the wasps would bring dirt up to the surface and then scatter it over quite a large area. If the wasps left their burrows for any time, great care was taken to camouflage the entrances. Rabbit droppings, sticks, dry pieces of clay and tea-tree fruits were used as "lids". The wasps appeared to be very careful and exact in this operation, taking up to ten minutes to place the camouflage material in an apparently correct position. Some wasps later returned to their holes, removed the coverings, and began excavating once more.

Several wasps had completed their digging and would fly away, returning after five to twelve minutes carrying small, light-green grasshoppers which were dragged into the holes. In one case, five grasshoppers were taken down.

On returning to the spot next day, I noticed three wasps busily refilling their holes, and I longed for a movie camera to capture the procedure. There seemed to be a sequence of filling first with fine dirt and then with larger pieces. The wasps first used the dirt around the entrance, then as the excavated material became more scattered, it was scraped into a line (similar to lines of felled trees ready for burning after clearing operations). The wasps worked along this line until all material had been used. One wasp bored out a round piece of clay nearby and after much manoeuvering used it as a final plug in the entrance. Another of the wasps used a rabbit dropping in the same way. When completed, it was extremely hard to see where the holes had been.

Mrs Bedggood adds that she is sorry that she is unable to help with "...other than such ordinary observations".

The above account demonstrates very well the rewards of patient observation. Further, it clearly illustrates that even the most "ordinary observations" make highly interesting reading for other naturalists.

R.H.J.McQ.

Gippsland Nature Notes

This group of observations was recently sent in by Mr L. A. Fell, a member of the Bairnsdale F.N.C.

The first Silver Eyes arrived here a few days ago for the summer, and this morning I watched a flock of them going over the brushes of a *Melaleuca incana* like honey-eaters. In the same bush were two Eastern Spinebills and several Singing Honeyeaters (*Meliphaga virescens*), showing that nectar was available. They all flew on to a *Callistemon viminalis* and repeated the performance. There were no aphids on either of the bushes.

A few weeks ago, I camped overnight with a mate on the Pinch River which flows into the Snowy a few miles across the N.S.W. border. The object of the visit was to see the local *Acacias* in full bloom. These are the Snowy River Wattle (*Acacia boormanii*), Kybean Wattle (*A. kybeanensis*), and Boomerang Wattle (*A. amoena*). In this area along the river there are also specimens of *A. floribunda* and, on a bluff just across the river, a few *A. doratoxylon*. Mr K. C. Rogers of Wulgulmerang had mentioned to me that the latter could be found in this area.

The best time to see these Wattles would be during the first two weeks of September. This is the only place in Victoria where *A. boormanii*, *A. kybeanensis* and possibly *A. amoena* can be seen.

A. boormanii is a graceful tall bush which grows on the alluvial verges of the river, whilst *A. kybeanensis* and *A. amoena* grow on the very dry shaley ridges and could easily be overlooked unless in flower. In bloom, they are quite dramatic, particularly where they grow in full sunlight. *A. kybeanensis* grows predominantly as the shrub-layer in eucalypt forest, while *A. amoena* is at its best in the woodland dominated by *Callitris hugelii* on the ridges above the Snowy River Valley.

The whole of Gippsland shows a very rich *Acacia* flora and, particularly in the Snowy River area, several unique species may be found. In an article in the *Naturalist* of October 1960, Mr Rogers emphasized the beauty of these wattles in early spring, which, to many people, are well worth a special trip to see and photograph.

Oasis in the City

The following excursion observations have come from Miss Janet Fitzgerald, writing on behalf of the Hawthorn Junior Club.

On Saturday, October 3, the Junior Field Naturalists went on excursion, led by Miss I. Forster, to the Royal Botanic Gardens, Melbourne.

Starting at the main gate and walking along by the lake we saw two Silver Gulls and a Coot building a nest at the edge of some reeds. Near the centre of the lake a Little Grebe was diving, staying underwater for some minutes, and close by a Coot was asleep on its nest.

There were many Black Ducks, some with young ones, a pair of Hardhead (White-eyed) Ducks with seven ducklings, and a Dusky Moorhen with seven young swimming through the lilies. Instead of trying to push a leaf out of the way, the chicks would run over it!

After watching these birds, we moved on past a pair of Black Swans and several young. In a large dead tree, there was a Little Wattlebird, seven Pied Cormorants, a large Black Cormorant, a pair of Nankeen Night Herons and a brown Bittern.

We also observed a Wattlebird, Bronze Cuckoo, Welcome Swallows, Mountain Duck, Raven and a White-plumed Honeyeater, together with sundry Blackbirds, Indian Mynahs and Sparrows. One Black Duck with fifteen chicks rounded off our successful excursion.

We were surprised to see so many birds near the heart of Melbourne. Later in the month, one of our members reported counting sixty Cormorants in the "Gardens".

This letter demonstrates very effectively the value of having large centralized reserves near city areas. These, when properly planned, greatly add to the beauty of any city, and Melbourne can be justly proud of the foresight which resulted in our "Gardens".

As a branch of the F.N.C.V., the Hawthorn Juniors are an extremely active and well organized group, which is extremely interested in all branches of natural history. Any club member willing to assist these youngsters in developing their interests should contact the Club's Immediate Past President, Mr D. E. McInnes. Any help whatever will be rewarding and eagerly accepted.—R.H.J.McQ.

Cumberland Valley Lyrebirds

This note has been forwarded by Mr S. A. Crichton of Alexandra.

One day recently, a party of us visited the Cumberland Falls area above Marysville. A short distance after crossing the bridge on the way to the "Big Timber", a Lyrebird ran along beside the track.

Invariably in this district, one's only glimpse of a Lyrebird is a disappearing flash. However, this bird was in no hurry, and I had time to whistle the party ahead who, on turning, were able to see it cross the track between us. Even then, it did not dash off, but flew to a leaning spar and commenced preening itself.

The other folk walked quietly back until we were all opposite the bird and no more than twelve feet away. Although it stopped and eyed us several times, it then continued with its toilet, and we were able to get some fairly good photographs before it finally flew down and wandered away amongst the ferns.

Is the ever-increasing stream of visitors to this area having the same effect upon these birds as it did upon those in the Sherbrooke area; are people being accepted as part of the natural habitat and not treated as intruders?

Microscopic Measurements

By D. E. McInnes

Every now and again a person looking at some object under the microscope wonders just what is the actual size of the whole, or part, under observation. It would be interesting to know how long that is, or how wide this is, or just how big are some of the minute creatures that are seen with the microscope.

Well, how does one make these measurements? What is needed is a built-in scale that can be seen when the object is in focus and the object measured by counting how many divisions of the scale it covers. We also need to know what the divisions of the scale represent in units of length when using different objectives and eyepieces.

To understand the built-in scale, let us try a simple experiment. Raise the eyepiece of your microscope half an inch up the tube and wrap a rubber band around a couple of times so that the eyepiece will stay in the raised position. Now focus the microscope on a simple flat object (some small print is ideal). The image seen is the object in a sharply defined circle. Now hold the eyepiece firmly and unscrew the top lens of the eyepice (the eyelens). This is where the rubber band comes in and holds the eyepiece from slipping down the tube.

Look down the eyepiece and you will see a washer with a hole in the centre (this is the diaphragm). With a low-power hand-lens focus on to the diaphragm and you will see the image of the object level with the diaphragm. If you could drop a little transparent ruler on to the diaphragm you would be able to see it and the image of the object together, and so have a scale seen with the object.

This is just what is done. A small transparent scale is cemented between two cover glasses which just fit on to the diaphragm, and this graticule, as it is called, is fitted in the eyepiece at the level of the diaphragm and you have what is known as a "Micrometer Eyepiece", or a separate micrometer graticule can be purchased and placed in position in any eyepiece. The eyelens of the eyepiece is like the hand lens and when screwed back is focused on graticule, diaphragm and image.

The next step is to know what length the divisions on the graticule will represent when different combinations of eyepieces and objectives are used. This is done simply by setting a length scale—parts of an inch or millimetres—on the stage (this scale is called a micrometer slide) and focusing the microscope; now the scale on the stage can be seen and also the divisions of the graticule, which are then calibrated for that particular combination of eyepiece and objective. If 10 divisions equal $\frac{1}{4}$" then 1 division equals 1/40". If 10 divisions equal 1/32" then 1 division equals 1/320", or if 10 divisions equal 1 millimetre then 1 division equals 0·1 mm. With high powers a finer micrometer slide is required, and small rulings of 100 parts to 1 mm. are used for the micrometer slide.

When a microscope has a tube-length that can be changed it is im-

portant that the tube-length be kept to a standard when calibrating the graticule, because the change of tube-length alters the magnification.

Thus all we need is a micrometer eyepiece or a micrometer graticule and a micrometer slide. You can buy these. A catalogue gives the following prices; Micrometer eyepiece, £4/3/-; graticule, £1/10/-; micrometer slide, £3/2/-, all plus tax. At this point, interest in microscopic measurements may start to fade, but if members could obtain a suitable transparent scale perhaps they could make their own graticules and micrometer slides. In fact, a fellow member has made available a scale, printed on film, with 80 divisions to the inch. This material is quite suitable to permit the average microscopist to make that occasional measurement. One inch of film, enough for a graticule, and a slide will be posted to any member who sends a stamped and addressed envelope to the address at the end of this article.

To make a micrometer slide, place a small amount of Canada balsam in xylol on a slide (well cleaned beforehand), carefully put ½" of scale on the drop, then place a drop of balsam on a clean ½" cover glass (round or square) and carefully lower on to the scale. Press the cover down firmly. The excess balsam will ooze out, but leave it alone and put the slide away for a few weeks for the balsam to harden, then trim with a razor blade.

A simple method is to stick the scale on to a slide with a small length of Durex tape. The divisions will not appear as sharp and clear as on the balsam slide and will not be as transparent. This method is only suitable for low power objectives.

To make the graticule, cement the film between two ½" No. 2 or No. 3 cover glasses with Canada balsam in xylol as with the slide. Be sure to trim the scale to about ⅛" wide and line one edge of the divisions right on the centre of the cover glass so that one half of the graticule is quite clear. Again, put it away until the balsam hardens (a few weeks), then trim the excess and clean. Balsam must be used for a graticule as it renders the film more transparent.

Correct position of the graticule: Remove the eyelens and place the graticule on the diaphragm, replace the eyelens, screw tight, and check to see that, when you look into the eyepiece, the graticule appears clear and sharply focused. If it is not, whilst still looking through the eyepiece slowly unscrew the eyelens. If the graticule then becomes sharp it means that the diaphragm has to be raised, so remove the lens at the other end (the field lens) and with a wooden dowel gently force the diaphragm into the correct position so that the graticule is in focus when the eyelens is screwed right up, then replace the field lens.

If the graticule will not focus sharp when unscrewing the eyelens, the diaphragm is too high. Remove the eyelens and field lens and gently press the diaphragm down into the correct position. A warning must be given here: the diaphragm is in the form of a dished washer and will move easily one way (usually upwards) and tend to jam in the reverse direction. Rather than damage the diaphragm by forcing it the wrong way, it is better to remove both lenses and push the diaphragm right through the easy way and then push up from the other end (do not damage internal threads) until it is in the correct position with the graticule in sharp focus with the eyepiece screwed home. Do not forget to ensure that the graticule is out and in a safe place when altering the diaphragm position.

Calibrations made with the 1/80 inch scale as a graticule and a micro-

meter slide gave these results with the F.N.C.V. microscope:

3X Objective and 5X Eyepiece—1 Division = 1/120 inch.
10X Objective and 5X Eyepiece—1 Division = 1/400 inch.
3X Objective and 10X Eyepiece—1 Division—1/144 inch.
10X Objective and 10X Eyepiece—1 Division = 1/500 inch.

Note that the use of the 10X eyepiece does not give twice as fine a scale but only 20 per cent finer. The explanation is that the eyelens of the 10X eyepiece also magnifies the graticule more than does the eyelens of the 5X eyepiece.

Address: 129 Waverley Road, East Malvern, S.E.5.

ERRATUM

On page 232 of December issue, second column, line 12; for *Boronia* read *Grevillea barclayana*.

PHOTOFLORA 1965

Entry forms for this photographic competition and exhibition are now available from the Native Plants Preservation Society of Victoria, 3 Denham Place, Toorak, S.E.2. Entries will be received 1-22 February, 1965.

There are four sections:

Section A—Wildflowers, excluding orchids—photographed singly, in groups or as part of the natural scene.

Section B—Landscapes featuring wildflowers—showing the contribution which massed wildflowers can make to our natural landscape.

Section C—Orchids—photographed as in Section A.

Section D—"In the Bush with a Camera"—presenting other aspects of natural vegetation, including tree studies, fruits, foliage, bark, ferns, grasses, mosses, fungi or illustrating a specific association of flowers and plants with insects, birds, etc.

One of the two awards in the last section is "The Victorian Naturalist" Trophy for a slide having a strong natural history interest (presented by the F.N.C.V.).

Snakes of the Melbourne Area

By Peter Rawlinson*

There is little accurate data on the reptiles of Melbourne and southern Victoria. This article on snakes has been prepared by the author after examination of material from these areas in an attempt to start filling in the gap. The approach adopted by Dr M. J. Littlejohn (1963) in *Frogs of the Melbourne Area* has been followed here so that these articles cover the same ground.

Recent collections of reptiles from the Melbourne metropolitan area (defined as the area enclosed by an arc of 25 miles radius from the Melbourne G.P.O.) have revealed the occurrence of seven species of snakes which are listed below. Collections 100 miles to the east and west of Melbourne have not yielded any additional species, but 50 miles to the north, across the Great Dividing Range, blind snakes, *Typhlops* sp., and some desert adapted elapid snakes e.g. *Denisonia gouldii* start to make their appearance. Thus the list is apparently complete for Melbourne and adjacent areas south of the Great Dividing Range.

All seven species occurring in the area under consideration belong to the Family *Elapidae*. The members of this family are venomous; however, three of the Melbourne species, the White Lip Snake (*Denisonia coronoides*), Little Whip Snake (*Denisonia flagellum*), and the Small-eyed Snake (*Denisonia nigrescens*) are of such a small size that they are not considered dangerous. Of the other four species, the two most common, the Copperhead (*Denisonia superba*) and Tiger Snake (*Notechis scutatus*) possess very potent venoms and have accounted for most snakebite deaths around Melbourne. The Brown Snake (*Demansia textilis*) and Black Snake (*Pseudechis porphyriacus*) are rather restricted in the metropolitan area. This fact, combined with the Brown Snake's small fangs and venom glands, and the Black Snake's weak venom, gives these two species a better record.

Snakes are adapted for preying on living animals. As they have no limbs, the physiology and morphology of snakes have become modified for capturing animals and swallowing them whole. In elapid snakes, digestive glands in the mouth have been modified to form venom glands which are connected to fangs in the upper jaw. The prey is killed by the injection of venom during capture. Use of the venom apparatus for defence against larger animals is only secondary. In feeding, elapid snakes seize the prey and hang on until the injected venom takes effect, then the prey is swallowed head first.

As snakes are dependent on living food, their distribution depends primarily on the abundance of their prey. The three small species, *Denisonia coronoides*, *D. flagellum* and *D. nigrescens*, feed on small lizards and insects, and are most common in rocky or log strewn country where their prey is abundant. Three of the larger species, *Denisonia superba*, *Notechis scutatus* and *Pseudechis porphyriacus* feed

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mainly on frogs, and are most common in creek and river valleys and swamps. The fourth large species, *Demansia textilis*, prefers mice and lizards and is more common in hilly, timbered areas.

A comparative study carried out by the author during the spring of 1962 on all seven species of snakes in Melbourne, revealed that two species, *Denisonia flagellum* and *D. nigrescens*, were nocturnal. They moved about actively in the open only after dark on warm evenings. The other five species were mainly diurnal, but all, particularly *Denisonia superba* and *Notechis scutatus*, also moved around after dark.

Late spring and early summer—from October to November—appears to be the mating season for all species. The young are born in the late sum-

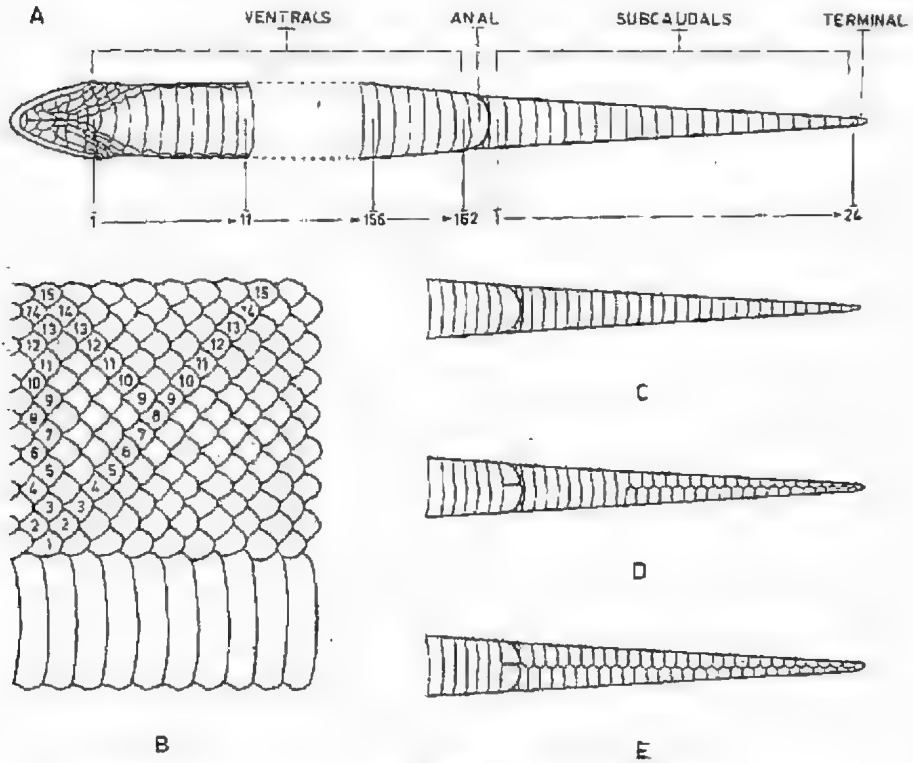

FIGURE 1

A. Ventral aspect of an elapid snake, showing ventral scales, anal scale, subcaudal scales and terminal scale.
B. Skin removed from mid-body of a snake and spread out to show the methods of making mid-body scale counts.
C. Ventral aspect of an elapid snake tail to show the entire anal scale and subcaudal scales characteristic of *Denisonia coronoides*, *D. flagellum*, *D. nigrescens*, *D. superba* and *Notechis scutatus*.
D. Ventral aspect of an elapid snake tail to show the pattern characteristic for *Pseudechis porphyriacus* with divided anal scale, anterior subcaudal scales entire, and posterior subcaudal scales divided.
E. Ventral aspect of an elapid snake tail to show the pattern characteristic for *Demansia textilis* with divided anal and subcaudal scales.

mer and autumn—February to April. All species except the Brown Snake (*Demansia textilis*) are viviparous, that is, they bear living young. The Brown Snake is oviparous and lays eggs. Of the seven species, only two, *Denisonia coronoides* and *Demansia textilis*, have a differently coloured juvenile (see descriptions).

The following keys have been designed to help in the rapid identification of snakes from Melbourne. There are two other families of reptiles occurring in southern Victoria whose general morphology often leads to their being mistaken for venomous snakes. These are the blind snakes, Family *Typhlopidae*, and legless lizards, Family *Pygopodidae*. Only the latter family is known from Melbourne, but the first key has been constructed to cover all three families. The second key is to the actual species of snakes which occur around Mel-

IDENTIFICATION OF THE FAMILY ELAPIDAE

1. Scales same size all round body; head blunt with small dark eyespots; tail very short, rounded, with a downward directed spine at the tip; mouth small, tongue forked:

Blind snake

Family: *Typhlopidae*

Ventral scales enlarged; eye distinct; tail tapered; mouth large 2

2. Ventral scales divided down centre; tail two to three times body length if complete; rudimentary leg flaps on either side of the cloaca; tongue large and flat:

Legless lizard

Family: *Pygopodidae*

Ventral scales not divided (Fig. 1A); tail short, about one-fifth body length; no rudimentary leg flaps (Fig. 1A); tongue forked:

Elapid snake

Family: *Elapidae*

KEY TO THE SNAKES OF MELBOURNE

FAMILY: ELAPIDAE

1. Anal scale and most or all subcaudal scales divided (Fig. 1D & E) . . 2
   Anal scale and subcaudal scales entire (Fig. 1C) 3
2. Dorsal scales light brown; ventral scales light brown; subcaudal scales light brown; head black above in smaller specimens (2 feet and under):

Brown Snake *Demansia textilis*

Dorsal scales black; ventral scales red or grey white; subcaudal scales black or dark grey:

Black Snake *Pseudechis porphyriacus*

3. Upper lip with a white stripe edged above with black passing from the snout, under the eye to the neck and sometimes beyond:

White Lip Snake *Denisonia coronoides*

Upper lip with no white stripe 4

4. Head black above; dorsal scales light to mid brown; scales glossy:

Little Whip Snake *Denisonia flagellum*

Not as above 5

5. Head dark grey to black above; dorsal scales dark grey; ventral scales grey-white or pink:

Small-eyed Snake *Denisonia nigrescens*

Not as above 6

6. 15 scales round mid-body; dorsal scales mid to dark brown:

Copperhead Snake *Denisonia superba*

17-19 scales round mid-body; dorsal scales usually green or brown with darker crossbands, rarely light brown with no crossbands:

Tiger Snake *Notechis scutatus*

bourne. It has been prepared after examination of living juvenile and adult snakes, and its use should be restricted to the snakes of this area, as no allowance for overlaps with other species has been made. Figure 1 has been provided to explain some of the features referred to in the keys.

The following species descriptions and head drawings are based on Melbourne or Victorian specimens. Length at birth for juveniles has been taken from recently born juveniles except in the case of *Denisonia nigrescens* where an estimate has been made. Maximum lengths of adults are estimates for the species concerned in Melbourne only. The figures of head shields were drawn to give visual aid in identifying specimens. Camera lucida drawings were made of *Denisonia coronoides*, *D. flagellum* and *D. nigrescens* and these are all to the same scale. The drawings of the four larger species were prepared using the usual drawing techniques, and are to a scale exactly half that of the former three.

Denisonia coronoides (Günther)

White Lip Snake

(Fig. 2: A)

Number examined: 29.

Scalation:

Scales round midbody: 15.
Ventrals: 134-152.
Anal: Entire.
Subcaudals: 44-58 all entire.

Description:

Juvenile:

Length at birth: 12 cms. (4¾ inches).

Colour: Dorsal scales black, ventral scales and subcaudal scales salmon pink to orange. Head same colour as body with a white stripe passing along the upper lip from the snout under the eye to the neck and sometimes beyond. Scales with a matt surface.

Adult:

Maximum length: 60 cms. (2 feet).

Colour: Brown olive or light green dorsal scales, ventral scales and subcaudal scales salmon pink to orange. Head same colour as body with a white stripe edged above with black passing from the snout, below the eye to the neck and sometimes beyond. Scales with a matt surface.

Reproduction: Viviparous.

Habits: Diurnal.

Food: Small lizards and insects.

Distribution: Throughout the metropolitan area in suitable rocky or timbered areas.

Comments: Most commonly found under rotting logs. On sunny days it is found in the open and it makes for cover rapidly on being disturbed.

Denisonia flagellum (McCoy)

Little Whip Snake

(Fig. 2: B)

Number examined: 68.

Scalation:

Scales round midbody: 17 commonly, 15 rarely.
Ventrals: 131-147.
Anal: Entire.
Subcaudals: 20-40, all entire.

In one specimen 3 of the posterior subcaudal scales were divided. Only two specimens had 15 scales round midbody.

Description

Juvenile:

Length at birth: 13 cms. (5 inches).
Colour: As in adult, see below.

Adult:

Maximum length: 42 cms. (16½ inches).

Colour: Light to mid brown dorsal scales, light to orange-brown ventral

scales. Head black above, often with a brown band across the snout, sides and ventral surface of head same colour as body. Scales very glossy.

Reproduction: Viviparous.

Habits: Nocturnal.

Food: Small lizards and insects.

Distribution: This species is abundant in rocky localities to the west and north-west of Melbourne, particularly on the basalt plains.

Comments: Never seen in the open during the day. Not a very fast moving species; when discovered it adopts a defensive pose, then moves off seeking cover. Emits a distinctive sharp ant-like odour. This is the only species of snake originally described from Melbourne. It is also remarkable for the fact that there is a sexual dimorphism which is easily observed. Females have an evenly tapering tail with 20 to 29 subcaudal scales, while males have a bulging tail with 29 to 40 subcaudal scales.

Denisonia nigrescens (Günther)

Small-eyed Snake

(Fig. 2: C)

Number examined: 10.

Scalation:

Scales round midbody: 15.
Ventrals: 166-177.
Anal: Entire.
Subcaudals: 33-41, all entire.

Description:

Juvenile:

Length at birth: 14 cms. (5½ inches).
Colour: As in adult, see below.

Adult:

Maximum length: 60 cms. (2 feet).

Colour: Dark gray dorsal scales, ventral scales light grey or pink towards the edges. Subcaudal scales darker than ventrals. Head dark grey or black above. Scales very glossy.

Reproduction: Viviparous.

Habits: Nocturnal.

Food: Small lizards and insects.

Distribution: Not abundant at any localities. Found in rocky areas, usually under granite exfoliation sheets. Appears to be restricted to the northern and eastern metropolitan area.

Comments: As with the previous species (*D. flagellum*), never seen in the open during the day. It is not a very fast moving species; when exposed it makes for fresh cover. Like *D. flagellum* it emits a distinctive, sharp, ant-like odour. This Melbourne species is similar to the Sydney form described by Günther as *Denisonia nigrescens* (see appendix).

Denisonia superba (Günther)

Copperhead Snake

(Fig. 2: D)

Number examined: 42.

Scalation:

Scales round midbody: 15.
Ventrals: 146-164.
Anal: Entire.
Subcaudals: 42-52, all entire.

Description:

Juvenile:

Length at birth: 17 cms. (6¾ inches).
Colour: As in adults, see below.

Adult:

Maximum length: 160 cms. (5 feet).

Colour: Mid brown to dark brown dorsal scales, lateral scales sometimes orange or red. Ventral scales light brown, orange-brown or green, subcaudals the same. Head the same colour as the body. Usually there is a dark band around the neck delimited posteriorly by a lighter band, but this disappears in large specimens. Scales with a matt surface.

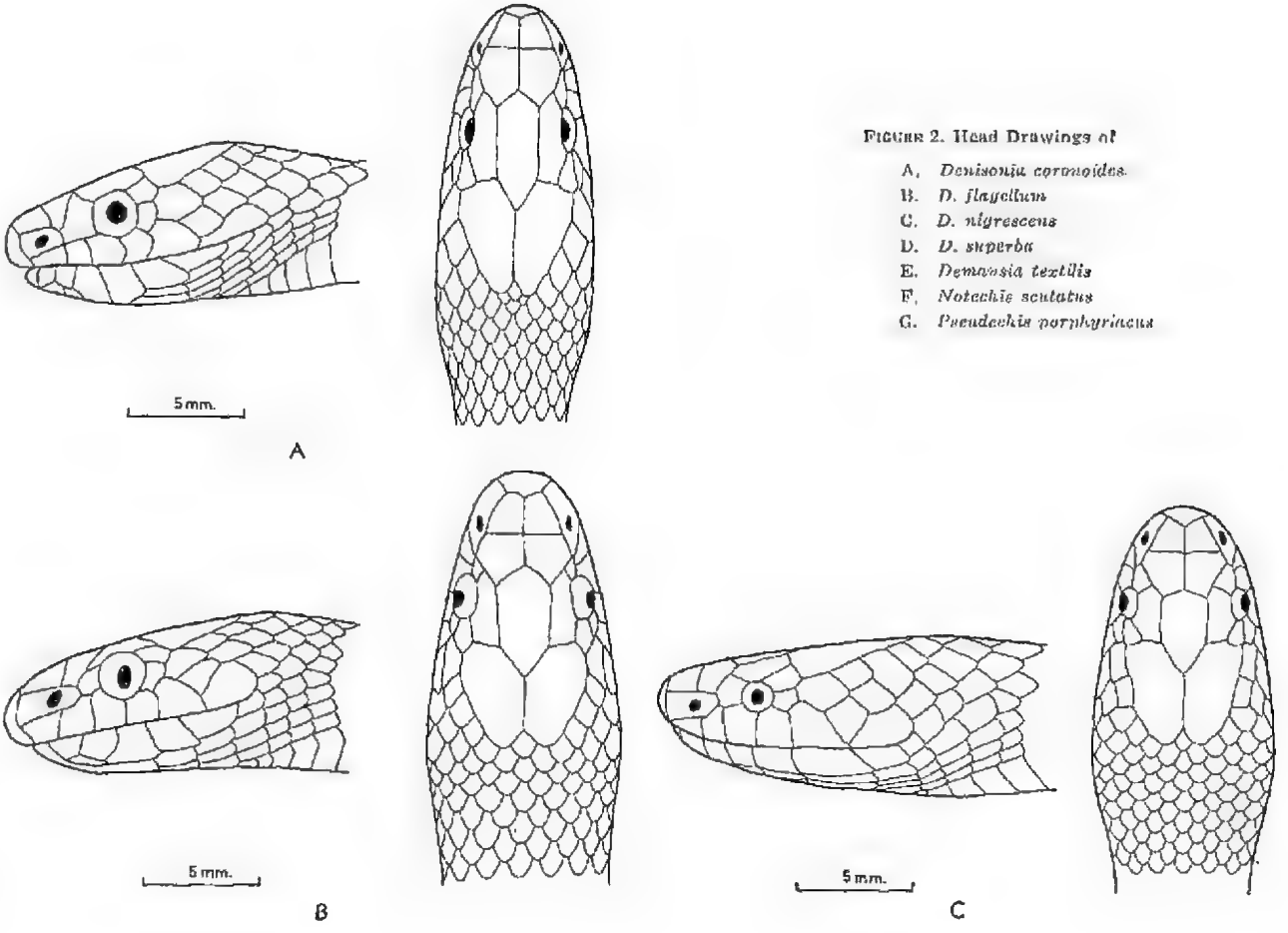

FIGURE 2. Head Drawings of

A. *Denisonia coronoides*
B. *D. flagellum*
C. *D. nigrescens*
D. *D. superba*
E. *Demansia textilis*
F. *Notechis scutatus*
G. *Pseudechis porphyriacus*

10 mm.
E
10 mm.
G
10 mm.
D
10 mm.
F

Reproduction: Viviparous.

Habits: Diurnal.

Food: Mainly frogs.

Distribution: Common throughout the metropolitan area except in the drier regions.

Comments: A rather bulky snake, which is not very fast moving. When provoked this species flattens the whole body, and hisses, then suddenly moves for cover. There are two forms of the copperhead in Victoria. Only one of these, identical with the Tasmanian form, occurs around Melbourne.

Demansia textilis (Duméril & Bibron)

Brown Snake

(Fig. 2: E)

Number examined: 12.

Scalation:

Scales round midbody: 17.
Ventrals: 200-213.
Anal: Divided.

Subcaudals: 51-69, usually all divided.

In some specimens, the first 5-10 subcaudal scales are entire, and the rest divided.

Description:

Juvenile:

Length at birth: 20 cms. (8 inches).

Colour: Light brown dorsal scales. Ventrals lightbrown to off-white, subcaudal scales the same. Dorsal surface of head black, with a black patch on the neck. Sides and ventral surface of head same as body scales with a semi-glossy surface.

Adult:

Maximum length: 240 cms. (7 feet 6 inches).

Colour: Light brown dorsal scales. Light brown to off-white ventral scales, subcaudal scales similar. Dorsal surface of head same as body; the juvenile head patch is absent. Scales with a semi-glossy surface.

Reproduction: Oviparous.

Habits: Diurnal.

Food: Mainly mice and lizards.

Distribution: Occurs throughout the metropolitan area, but is not abundant at any locality. More commonly met with in hilly, dry areas.

Comments: A slender, fast-moving species. When provoked, brown snakes will sometimes attack any moving objects within range. Due to their small fangs and venom glands, brown snakes throw body coils around captured animals to restrict struggling before the venom takes effect.

Notechis scutatus (Peters)

Tiger Snake

(Fig. 2: F)

Number examined: 40.

Scalation:

Scales round midbody: 19 commonly, 17 rarely.
Ventrals: 158-183.
Anal: Entire.
Subcaudals: 42-59, all entire.

In one specimen 5 of the posterior subcaudals were divided, and in another, the anal scale was divided. Three specimens had 17 scales round midbody.

Description:

Juvenile:

Length at birth: 18 cms. (7 inches).
Colour: As in adult, see below.

Adult:

Maximum length: 170 cms. (5 feet 6 inches).

Colour: Variable, green or brown dorsal scales traversed every inch or so by darker crossbands. Ventral

scales lighter green or brown, sometimes yellow; subcaudals the same as ventrals. Head the same colour as the body. Scales with a semi-glossy to matt surface.*

Reproduction: Viviparous.

Habits: Diurnal.

Food: Mainly frogs.

Distribution: Occurs throughout the metropolitan area, and is abundant in many localities, particularly low-lying swamps.

Comments: Although diurnal, tiger snakes have been observed by the author actively hunting and catching frogs between the hours of 9 and 11 p.m. on a warm evening.

This species is capable of fast movements, but is not so agile as the brown snake. When provoked, tiger snakes spread the neck in cobra fashion and hiss violently, but make for cover rather than attack.

Pseudechis porphyriacus (Shaw)

Black Snake

(Fig. 2: G)

Number examined: 29.

Scalation:

Scales round midbody: 17.

Ventrals: 176-191.

Anal: Divided.

Subcaudals: 48-62, mainly divided.

The first 6-19 subcaudals are entire, and the rest divided.

Description:

Juvenile:

Length at birth: 30 cms. (12 inches).

Colour: As in adult, see below.

Adult:

Maximum length: 220 cms. (7 feet).

Colour: Dorsal scales black, scales adjacent to ventrals usually half black, half crimson. Ventral scales usually red or pink, sometimes grey white. Subcaudal scales black or dark grey. Head black above. Scales with a semi-glossy to glossy surface.

Reproduction: Viviparous.

Habits: Diurnal.

Food: Mainly frogs.

Distribution: Apparently restricted in the metropolitan area to the larger river and creek valleys and adjacent areas. Not very common.

Comments: Adult specimens are rather slow moving but capable of more rapid movements than copperhead snakes. Specimens flatten the neck and anterior body to a small extent on provocation and hiss violently, making for cover at the first chance.

APPENDIX

It should be noted that certain generic names used in this article do not correspond with those given by Worrell (1963). The reason is that Worrell revised the taxonomy of the elapid snakes in his book, but his revisions have not received any recognition to date. To avoid further confusion, the older, accepted names have been used here.

The alternatives are as follows:

Accepted name:

1.—*Denisonia coronoides*
2.—*Denisonia flagellum*
3.—*Denisonia nigrescens*
4.—*Demansia textilis*

Worrell's alternative:

1.—*Drysdalia coronoides*
2.—*Cryptophis flagellum*
3.—*Cryptophis nigrescens*
4.—*Pseudonaja textilis*

A second point is that the name *Denisonia nigrescens* has been used for

* There is a colour morph with no darker crossbands, which has a light brown body and green or brown head. The litter of a banded female contained half banded and half unbanded juveniles, so this morph is apparently inherited as a simple dominant or recessive.

the Small-eyed Snake. Recent books (Kinghorn, 1956) have been using the name *Denisonia pallidiceps*, as the former species was synonymized with the latter. Worrell re-erected *D. nigrescens* (Worrell, 1963) and the author has used this name for the following reasons.

Firstly, both were described by Günther, who must have seen a difference between the two. Secondly, the type locality for *D. pallidiceps* is Port Essington N.T. and North-east Australia, whilst the type locality for *D. nigrescens* is Sydney. The author has definitely collected the Melbourne species in Sydney, and wishes to compare the Melbourne species with the Sydney species rather than with an unseen Northern Australian snake. A third, but less important, point is that the colour of Melbourne specimens compares with *D. nigrescens* but not with *D. pallidiceps*.

ACKNOWLEDGEMENTS

The author wishes to thank Mr W. R. Rawlinson for collecting many of the specimens used in this study.

The assistance of a Commonwealth grant during the collection and study of data is gratefully acknowledged.

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Notes on a New Guinea Quoll

By GRAEME G. GEORGE

The New Guinea Quoll (*Satanellus albopunctatus*) is a little-known mammal, not well represented in museum collections and rarely met with in the field. It is uncommon but widespread throughout New Guinea at altitudes up to 7,500 ft., but has not been recorded from the lowlands of western Papua.

The quoll of New Guinea has its nearest relation in the Northern Quoll (*Satanellus hallucatus*) of the northern parts of Australia. These two species are the smallest and least progressive of the quolls, sharing, as well as the smaller size, striated sole pads, a hallux on the hind foot and differentiated incisor teeth.

David Fleay compared some northern quolls with the Southern Quoll (*Dasyurus viverrinus**) of south-eastern Australia (Fleay, 1962). Among other things he noted the more profuse spotting of the northern species, the climbing ability, savage disposition and phascogale-like reactions when alarmed. New Guinea quolls appear to have the same daring as Australian quolls as one was trapped in a camp area by a collecting expedition on Mt Dayman in eastern Papua (Brass, 1956).

The chance to observe and compare a New Guinea quoll came in July of this year (1964) when I obtained a female in the Southern Highlands of Papua. It was caught by a native youth

*The name *D. quoll* has been replaced by the name *D. viverrinus*, owing to a ruling of the International Commission on Zoological Nomenclature.

in grass near the Mendi River, about two miles north of Bela, at an altitude of about 6,400 ft. It was kept in captivity for just under three weeks, before it escaped from its cage during the night of 28th July.

It was quite a handsome animal, small and lithe, with short, close fur. Its head showed a likeness to the Tuan (*Phascogale tapoatafa*), being wide and flat with large prominent eyes. The tail, clothed in short dark brown fur, was long and thin, not bushy. The body was long and thin and the legs appeared to be long with prominent toes. The general shortness of the fur all over no doubt stimulated the impression of slimness. It was dark brown above, orange-rufous on the head and flanks, buff about the throat and white on the abdomen. The white spotting on the back was finer, sparser and less extensive than in Australian quolls.

On receiving the animal I offered it strips of cold roast lamb, having nothing else available. It pushed a piece around the bottom of the cage with its wet nose, then held it down with a forefoot and licked it for some time. It later ate another piece while holding it in a forefoot just as a possum does. It ignored a katydid grasshopper, but immediately ate mole-crickets and cockchafer grubs. Lizards and small rats (*Rattus exulans*—the ubiquitous Malay or Pacific Islands Rat) were easily obtained locally, and the quoll ate these readily. When they were introduced into its cage alive, the quoll killed the rats and lizards with a crushing bite across the skull, and proceeded to eat them entire, head first. It had a good appetite and once devoured the carcass of a four-month old fowl overnight. As it got accustomed to its confined cage, it quickly seized any animal or piece of meat placed inside. It was not fond of very fatty scraps from the kitchen, and left these lying about even when it had nothing else to eat. I tried it on tinned mackerel-pike when other fare was short, and it ate this after licking the juices off first. It may have licked the fish first through thirst, as its tin of water was never in the cage for a whole night without being knocked over. Each time a tin of fresh water was put in the cage it drank readily.

I once attempted to grab it to inspect it, but it ran along my arm towards the door of the cage and sank its teeth into my arm when I stopped it. Fortunately most of the teeth were buried in a woollen pullover, but it took some time before the quoll could be induced to relax its grip and then, when it did, it fastened on to the tip of my glove. This entailed further shaking and manoeuvering, after which it was left in peace in its cage.

When disturbed it made low, soft, chirring noises. On several occasions at night, while it was alone and undisturbed, it surprised with strange loud noises, something like a deep prolonged grunting, made while alternately inhaling and exhaling several times, building up in intensity and then tapering off.

When set loose in a large wire enclosure it showed considerable inclination to climb. It used a galloping kind of motion, alternately gripping with fore and hind feet, to climb up posts. Descents were made head-first with the hind legs spread sideways gripping the post. In this attitude the quoll looked like an overgrown phascogale. On the wire netting it was rather clumsy. While it was climbing about, the short hairs on the terminal half of the tail were semi-erect. When pacing the side of the wire enclosure it moved on the toes of its hind feet and held the tail stiffly behind it.

In its climbing ability, posture and dislike of handling, the New Guinea

Quoll shows characteristics similar to its close relation, the Northern Quoll. The partial erection of hairs on the tail, its general appearance (apart from the spotted coat) and the tenacious grip with its teeth, make interesting comparisons with the Tuan (see Wakefield, 1961).

The quoll is known to Mendi natives as "Hubial", and it is reputed to live close to streams in thickets of cane-grass (*Saccharum* spp.), which is known in New Guinea as "pit-pit". In such a habitat it could be expected to live mainly on insects, but small mammals, birds and lizards probably form a large part of its diet, as the animal that I had demonstrated its ability to cope with such fare. It is apparently a fairly adaptable animal as it has a wide distribution and occurs in both forested and grassland areas.

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Field Naturalists Club of Victoria

General Meeting—December 14, 1964

Opening the meeting the President, Mr M. K. Houghton welcomed members and guests including Lieutenant Brown from Queensland. The Meeting stood in silence in memory of Miss Isobel Annear whose death had occurred on December 4.

After confirmation of the Minutes, the Secretary, Mr Coghill, announced that Christmas Cards had been received from our Patron, Sir Rohan Delacombe, and from the National Museum. The profit of the 1964 Nature Show had been £206 of which one third had been forwarded to the Society for Growing Australian Plants. A letter had been received from the executor of the estate of the late Mrs. Ruby Lewis advising that Mrs Lewis had bequeathed a sum of £200 and all her natural history books to the Club. Mr Coghill tabled a letter from Mr Mills of the State School, Numurkah, asking for information on the Barmah Lakes area in Northern Victoria. He was writing a thesis and would like to know of any old reports covering the climate, soils, vegetation, economic products, etc. Mr Ros Garnet and Mr A. Fairhall moved and seconded a resolution that Miss Marie Allender be made an Honorary Member of the Club. The speakers paid tribute to Miss Allender's cheerfulness and efficiency in organizing the excursions over the past ten years; she had devoted a good part of her life to the Club. The motion was carried with acclamation.

Mr David Morgan was the speaker for the evening and his subject "The Grass-wren Story". He gave a most graphic account of his two expeditions. In the first he and his wife went up the Birdsville Track to the edge of Simpson Desert without finding any trace of the bird. On the second he and his wife were accompanied by three other naturalists. They took two vehicles and a trailer and travelled along the old Oodnadatta road to a point north of Edwards Creek where they turned north-east and crossed the stoney tableland to reach Christmas Waterhole on the Macumba River. Here in tussocks of Cane-grass, *Zygochloa paradoxa* they rediscovered *Amytornis goyderi*. This grass-wren is so small that it passed through the meshes of the mist net and it could not be caught to be

photographed. However a picture was obtained of two young birds in the nest. The bird is very easily overlooked because it is difficult to persuade it to leave the protective cover of clumps of cane-grass.

The President thanked Mr Morgan for his interesting talk and Mrs Morgan for operating the projector. The slides illustrated very well the difficulties of the journey and, where there was any, the vegetation along the route.

The new members listed on page 235 of the December *Naturalist* were elected. The President pointed out that there would be no Group Meetings before the January General Meeting.

Mrs Wollard asked any Members who had purchased *Australian Honeyeaters* and who had not obtained a copy of the errata slip issued by the Bird Observers' Club to contact her so that she could obtain copies for them.

Mr Jim Willis reported that Mr Cliff Beauglehole had discovered a new Trigger plant in the locality where he had found Violet Arrons.

The exhibit table carried specimens of *Melaleuca pentagona* originating in W. Australia from the Maranoa Gardens, Cranesbills scattering seeds and Saunders Case-moths, *Metura elongata*, all brought by Mr Swaby. There was also an abnormal fruiting *Banksia* inflorescence with a question, was it due to gall insects, fungus infection or what?

The meeting closed after the President had wished all Members the Compliments of the season.

Botany Group—November 12, 1964

Mr Bruce Fuhrer occupied the chair and 19 members were present.

Miss M. Lester spoke on "Leaves and Photosynthesis". The speaker explained, by means of diagrams and specimens, the process whereby leaves manufacture carbohydrates, how green plants build organic matter from inorganic matter and how all life on Earth, in the sea and on the land, depends on the process of photosynthesis by green leaves.

It was decided that the theme of the Group exhibit at the 1965 Nature Show be "The Vegetable Kingdom". Recent excursions to Monbulk and Blackwood were most successful. Twenty-seven members attended the Blackwood outing and were rewarded by wonderful displays of *Baeckea* and *Tetratheca*. Also seen were a number of rarer plants including *Prostanthera rotundifolia* and *Pultenaea weindorferi*.

Geology Group—December 2, 1964

Thirty-nine members and visitors were present, with Mr L. Angior in the chair.

Mr R. Dodds gave a report on the Group's weekend excursion to Campbelltown on the 7th and 8th November. Eleven persons attended, including Mr Harry Barclay, Secretary of the Creswick Club. A stop was made at the railway tunnel near Elphinstone Station, to examine the metamorphosed aureole at the granite contact and to search for any specimens of hornfels. The party then proceeded via Castlemaine and Newstead to Campbelltown, where camp was set up. Mr and Mrs Neven of Werona met the excursionists and were very efficient guides, conducting the group to the various points of interest. The Campbelltown Fault was traced, glacial areas examined, graptolites were collected and other features were visited, so completing a thorough geological exploration of the district.

Mr. N. Wigmore stated that a series of stereoscopic photographs of glacial pavements at the Eppalock Weir, taken by Mr Robbins of Bendigo, had been passed to the Geology School of Melbourne University for examination and comment.

Mr R. Dodds was appointed secretary of the Group for 1965.

The speaker for the evening was Mr Bruce Jones, who dealt with Geomorphology. The term was defined as the science of land-forms or surface features, which involved much description and interpretation. A basic concept was that of uniformitarianism, which stated that physical processes, throughout the whole history of the earth, had always operated in the same manner but not at the same intensity. Weathering processes had also been the same, but they had acted differently on the different classes of rocks. The interaction of all these forces had formed the surface features with which we were all familiar. Uplift and then erosion sculptured the land, making the difference between old and new areas. Climate was also a big factor in geomorphology, as it aided chemical action. Rainfall, whether heavy or light, and its extent, governed landforms. Temperature ranges through perma-frost to great heat had certain important effects. Geomorphology had been a "Cinderella" science in Geology

and prior to 1890 was of little consequence. Since the last war, developments had been rapid and the science had been split into parts, dealing with streams, deserts, colder regions, coasts etc. The speaker then dealt fully with coastal formations and the action of wave mechanics. The talk closed with the showing of a series of prints illustrating various land-forms and slides of scenes along the Victorian Coast.

Exhibits: Opalized wood (she-oak), serpentine with asbestos, stichtite, crocoite, all from Tasmania (Mr D. Dangerfield); mica-schist and graphic granite from Albury (Mrs Salau); corundum, amazonite, amethyst crystal, moonstone, white sapphire crystal, red corundum var. ruby, blue sapphire, green beryl crystal all from Anakie, Qld. (Mr R. Davidson); limestone with fossils from Tyers River Gorge (Mr D. McInnes); gneiss from Permian glacial Werona, limestone with corals, crinoids, brachypods from Devonian of Tyers River Gorge (Mr T. Sault); new Tectonic Map of Australia with notes (Mr R. Dodds).

The meeting closed with the Chairman, supported by the Secretary, wishing members all the best for Christmas and the New Year.

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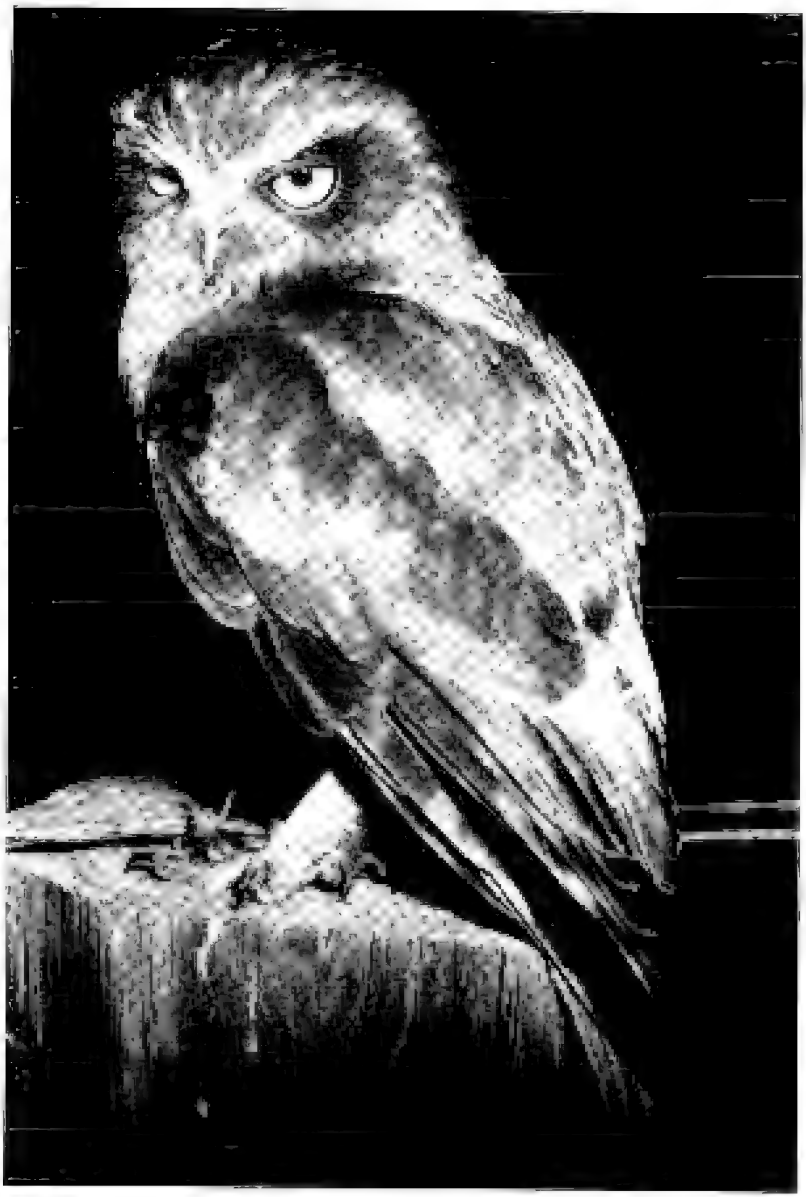

Boobook Owl (*Ninox novae-seelandiae*)

Photo, *W. H. King.*

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The Victorian Naturalist

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Front Cover:

The photograph on the cover shows a Grey Thrush, *Colluricincla harmonica*, feeding young. Taken by A. D. Selby it appeared in the January 1928 issue of the *Victorian Naturalist, 44, 258*

"Absolute Stinkers, those Nellies!"

By John Béchervaise

Heard Island, Saturday, September 12, 1953

To lie observing but unobserved, close to a congregation of sea-birds, is a rewarding experience. After an early breakfast, Ron escorted Arthur and me down to the wind-shaken hide we had erected late yesterday afternoon. The easily alarmed Giant Petrels rose in spiral wheelings of increasing diameter, until they seemed to be surveying the entire cove; the Dominicans withdrew a hundred yards or so to the snow-mantled tussocks of poa-grass and mounds of azorella; only for the Sheathbills, constant in their attention to all man-given opportunities, our arrival meant peace, and, free from the ungentle competition of the larger birds, they moved in like a flock of domestic fowls pecking at newly thrown wheat. The only other birds present, warily riding the rough wind, were three or four Southern Skuas, drawn back from distant, kinder wintering by the imminence of the elephant-seal breeding season. But these scavengers and predators are quite as eager for the by-products of death, as of birth. First, watchful for placentae and any still-born pups they may find, they patronize the seal harems; later they will gather in the penguin rookeries, alert for eggs and unguarded chicks; today's banquet was unscheduled. Well away from the scene, riding the waves as buoyantly as kapok, lay a flotilla of about a hundred Cape Pigeons; for them there would surely be many inadvertent contributions, morsels dropped from the skies by the greedy or over eager.

We sat smoking for a while, watching the vocal Paddies' fowlyard; then Ron left us, and the unarithmetical Giant Petrels considered the coast to be clear of human intruders; the bulky, brown-green tent was just a rock or an elephant seal, unworthy of fear. In came the Nellies, from superb, seemingly effortless flight, to their ungainly landings. For lift and balance in the streaming wind, they seemed to use their wings constantly; their queer compound bills jerked forward; pale-ringed eyes still peered just a trifle uneasily. Remaining airborne on the sidelines, almost motionless for several seconds before stretching down their legs to the snow, the Dominicans arrived in all stages of development: black-billed and dappled; bills yellow and red-flecked, bodies clear white and black habited like their namesake monks; and many at stages intermediate between the two extremes of yearling and adult plumage. Into the magnetic, bloody carcase were drawn the hook-billed, offal-loving skuas, seeming, by contrast with the now marginal Paddies, as black as death.

Our spy-holes in the tent, where we lay on down bags and foamed plastic squares for insulation from the cold, were just seventeen feet from weltering commotion. Had the birds seized our presence, they would have scattered to the winds which tore the cove into spray, and bellied our stubborn little shelter. We could clearly see the red-stained bills; sense the eternally unstable relationship of creatures to whom relentless, competitive food-seeking is the condition of survival.

The Giant Petrels, always less at ease on the ground than in the sky,

Giant Petrels, *Macronectes giganteus*. Head Island, with some Sheathbills, *Chionis minor nasicornis*. "Here, amidst the entrails they seemed like pterodactyls, primitive terrible birds of the Unshapen Land, with beaded reptilian eyes, and serviceable, but awkward bills .... "

ANARE Photo: *John Béchevaise*

wobbled on their legs like cripples, recovering balance by curious, uncertain side-stepping, but always dependent on their upraised yet drooping wings. Here, amidst the entrails, they seemed like pterodactyls, primitive terrible birds of the Unshapen Land, with beaded reptilean eyes and serviceable but awkward limbs. Most of the birds were very dark, with tremendous grey-yellow bills, culmen of characteristic breathing-tube and curved unguis, buttressed by other parts to form a sexpartite organ of formidable power. The older and more aggressive birds, probably denoted by lighter, greying throat and head, ruled this bloody roost, being quick to attack the younger and darker interlopers of their own species. Arthur is very interested in the occasional light, even white Giant Petrels; but, on Heard Island, these are relatively rare, and none attended today's orgy.

The gulls, both Dominicans and Skuas, seldom came within reach of their displeasure, yet contrived to obtain their share. The perky little Paddies were ignored by the masters as mere land-birds whose pickings, in any case, were inconsiderable.

Working with my telephoto lens, I exposed a large quantity of film, some for colour, but I frequently put my camera aside and just watched. I find that it is difficult to observe anything well and at the same time to concentrate on speeds and apertures. Some of the more aggressive attitudes of the birds—wings extended and tail forming a widespread fan, were worth watching; the birds seemed sullen and ill-tempered, quite humourless by comparison even with the Skuas. I do not, of course, attribute human emotions to the Giant Petrels, except by way of describing their appearance and their apparent behaviour.

Every now and then a panic came over the birds—all except the cheerful Paddies. By some instantaneous and common consent, the sea-birds rose

in vociferous alarm. Some movement far off at the station might have been responsible, or the crawling tractor skirting the Nullarbor on its weekly task of dumping the station waste. After a time the birds would drift back, landing warily at some little distance from the carcase and mincing forward the last few yards.

A few of all species, except the Dominicans, possessed plastic or aluminium rings showing the attentions of A.N.A.R.E. biologists; mostly they were Paddies. One two- or three-year old Nelly wore a band which had opened, which would soon be lost. Arthur recorded all details of ringed birds.

Bird-watching must always be a fascinating pastime, but for there to be two or three hundred birds of four species squabbling and eager, all at arm's length, is quite memorable. We were so close that, at times, the big fulmars and swift little Sheathbills passed within two or three feet of us. For two hours we lay in the tent, as though in invisible suits. Then we disturbed the feasting and were blown back to the station, realizing, for the first time, how bitterly cold the wind was.

In the afternoon I escorted Jim down to the tent and left him there. Later again, Arthur and Dick went down to see if they could catch some birds with a pole and wire loop; they were unsuccessful. It is very difficult to ring mature birds, except at critical times of their brooding periods.

Tuesday, September 15

Although I had no quarrel with sleep, something of the continuous violence of the storm must have penetrated my mind. I had fallen asleep to the sound of the straining of the station, the complaint of wood and iron, and of the sonorous aerials; I awoke eight hours later and there was no change. The anemometer had become snowed up and was recording sluggishly, but, even so, had traced blasts reaching the century every now and then throughout the night. There is no possible withdrawal from the hurricane, even though the ear becomes accustomed to its fury. Somewhere within one there is a taut strain of consciousness, something parallel with, but different from, anxiety; perhaps the tension of some atavism that exults and cowers together.

The air between Atlas Cove and Corinthian Bay was charged with fine sea-spray, giving an illusion of thaw in salt-wet walls, and even on the ice-surface. The big iron buoy in the cove had broken loose, its steel cables snapped. It lay rolling in the surf. Our home-made bird-watching tent on Wharf Point was, amazingly, still steadfast.[1] Surely no small two-man tent could have undergone a more stringent testing! It seems years since the dry summer days at Tottenham, when Leon and I cut and sewed the fabric, and debated the stresses of just such occasions as this. Magnificent breakers, spray streaming hundreds of feet behind, crashed to a height of forty or fifty feet against the terminal seracs of the Baudissen Glacier.

Releasing meteorological balloons in such weather is a game for several players. Four of us, looking like an Atlas quartet, knelt round the nylon sheet that encompased the white 'sonde balloon. We managed to steer the balloon clear of the shed, but, immediately it was released, it dived to earth. Fortunately the radiosonde itself was undamaged, and a later

[1] This kind of tent, an adaptation, by the author, of the famous *Meade* mountaineering tent, has since become an item of standard equipment for our field parties on the Antarctic continent.

Giant Petrel *Macronectes giganteus*, and Heard Island Sheathbills, *Chionis minor nasicornis*, feeding together on the carcase of an Elephant Seal. The typical raised wings of the petrel, its "white-ringed eye" and the compound bill with breathing tube, are clearly visible.

ANARE Photo: *John Béchervaise.*

attempt was successful. Shortly after the first release, I found Fred up the Dines anemometer mast, attempting to clear the tube. He was wearing a safety belt but, even so, appeared most insecure.

I had a pleasant, busy morning in the Biology Lab., cleaning newly developed films with alcohol, answering signals from Melbourne, and writing some reports. The afternoon divided itself between a contact-printer I am making, and the task of striking the tent. The former job progresses slowly; it is so easy to visualize the completed apparatus, but to convert bolt-heads into turning screws, copper-tubes into rubber-covered rollers, and to grind down the hard edges of plate-glass, all take time. A couple of hours in Jack's workshop pass like a riffle on water; it is tea-time, and I have the help of Arthur in taking down the tent.

Smothered in salt spray, snow and ice, with all the metal tubes frozen in their "socks", and with a mean wind of perhaps forty-five knots, the tent was not co-operative. However, we merely collapsed it, and trundled it back to the camp slung on a bamboo pole, our shoulders taking the strain awkwardly, our feet slipping about on the miniature glaciers that run down from the tussocks to the sea. The carcase was still not quite cleaned out, so still the Nellies, Paddies, Skuas and Dominicans gather off Wharf Point.

Wednesday, September 16

This morning held only a faint, exhausted wind. Over an ice-glazed beach I walked to West Bay, passing three very tired leopards which had dragged themselves ashore after the storm. They scarcely flickered an eyelid at me, even when I moved quite close. The thaw, followed by the slight freeze, had formed continuous milky ice-sheets rippling down from the plain level to the sea. The whole of the Nullarbor and the Windy City flats would be inundated by a eustatic rise

of a few feet; there is no doubt that they were submerged in the geologically recent past. I watched the Dominicans courting, following each other like shadows and collected three spherical shinglestones to take home some day to my sister Mary, whose birthday it was.

Several Nellies diverted me to Wharf Point, but they became alarmed at my approach and ran wildly away, wings outstretched, trying to become airborne. But so gorged were they with seal-offal, that they gave up the effort; all except one who desperately trod the sea before jettisoning some of his surplus undigested fuel to the ever-accommodating Cape Pigeons. So he obtained sufficient lift. I think it was Jim who, witnessing the same ungraceful capitulation to the laws of aerodynamics, remarked, "Absolute Stinkers, those Nellies!"

After lunch, Jim, Jack, Berni and I travelled with the tractor to West Bay, to shovel up four drums of shingle for concrete. We rumbled over the thick ice, the sledge occasionally sliding forward faster than the tractor, and becoming entangled in its own sling. Having dropped off batteries at the West Bay Magnetic Station, we moved on to the beach where, not far from the melancholy evidence of another elephant-seal slaughter, the seas have piled up banks of shingle several feet high. We shovelled some tons of stones that will ultimately be used at the projected Base on the Antarctic Continent.[2] watched without interest by two vast breeding bulls and three or four cows, heavy with young. Then we all pressed along to the far end of the little cliff, and snigged up driftwood to make good measure for the homeward load.

There was a desolate yet lovable atmosphere under Andrée's snow-filled gullies; an even light, and a grey sea breaking on ice fragments and countless millions of rounded boulders; the azorella was warm and brown in hue where the snow had been blown away. There is an extraordinary fascination about collecting great sea-borne spars redolent of forested lands far to the north, and of ships sailing in frequented waters.

Thursday, September 17

Here calm is as common as hurricane in Melbourne, and as remarkable. It is just an interval in the normal wildness of weather, and is always remembered as the aftermath or prelude of storm. Generally it is a time of relashing, reclaiming, and making fast. So, this morning. The gale had worn itself out, the sky was grey and bleary-eyed; yet the utter silence, a foil for all sorts of slight, pleasant sounds—voices of dogs and men, the striking of a hammer, the cry of a bird—only lasted an hour or two. Then again the air was dense with blizzard snow from the west, veering northward to slight thaw, in the evening backing a quadrant to dryness and several degrees of frost . .

Friday, September 18

It was a harsh walk to West Bay this morning, facing a dry, cold blizzard from the south-west, bearing ten degrees of frost. The black-sand beach, glazed with ice and scalloped by frozen tide-wash, only accentuated the forlorn white landscape. I shrank within my anorak, and leant forward on the wind. Frequently it whipped up the ground snow in opaque clouds through which I struggled uncertainly until they cleared sufficiently to show

[2] At the time of writing *Log for Lorna*, Mawson, now Australia's most important Antarctic base, was in the early planning stages. It is planned to carry the *Antarctic Wildlife Series* forward to include journal entries made on the Continent during 1955-1960.

the bitter rustling sea, or the icy outlines of the little mountains—Drygalski, Andrée, Aubert de La Rüe.[3]

The fine magnetic robots at West Bay functioned well as usual in the sub-freezing darkness. If the way out was contested, the homeward trek was more treacherous. If you make the mistake of trying to move with the wind, all control is soon lost, and soon your legs cannot keep up with your body

Tuesday, September 22

The mountain remained clear to at least four thousand feet, everywhere, and rifts revealed the ice-cliffs to a much greater height in several places. The sky was hazed with a fine film of cirro-stratus; the wind lay in the south-west, and there was a falling barometer. Through my binoculars, I searched vainly for a sign of our Camp IV on the Abbotsmith Glacier;[4] possibly it is entirely snowed over.

Quite a lot of life was out enjoying the morning. An elephant-seal cow, advanced in pregnancy, was making her way determinedly over the snow from Atlas Cove to West Bay. Her route was quite straight, yet it lay slightly uphill at the start. By taking the "overland", the cow was saving herself at least twenty miles of swimming. She found it hard work, though, puffing along with four or five flipper-hauls of about six inches each, then resting, much out of breath. As I have previously noted, the directness of these apparently intentional short-cuts is astonishing. Having spent months at sea, this expectant mother hauls out on a fine sunny morning and, carrying an unborn pup weighing perhaps eighty pounds, immediately sets out over featureless snow for her appointments with the spring and summer.

The shags were parading in full force; two pairs of Gentoo penguins were strolling along the foreshore and very solemnly inspecting three grey leopards, one very emaciated, perhaps sick. In the water, the leopards are the penguins' most terrible enemy; on the snowy land, perhaps neither recognizes the other.

Thursday, September 24

I worked on the snow-melter after lunch until tea-time, when James relieved me, and continued until dusk. The three men rostered for the afternoon, burning many barrows of blubber, and endlessly shovelling snow, almost filled the big tank. At about the times James took over, snow commenced falling; it continued for five hours. In the mid-evening there was a slight thaw.

Dick and Ron met the sledge party returning at dusk. The latter's great excitement was the discovery, at South West Bay, of a Ross Seal (*Ommatophoca rossi*), the rarest seal in the world. Arthur considers the find constitutes a new record for all sub-Antarctic latitudes, the creature being a denizen of the pack-ice, leading a solitary existence, and very seldom seen. Jim, Arthur and I decided to go

[3] Drygalski, Andrée, Aubert de La Rüe: all named for polar explorers. Drygalski was leader of the *Gauss* Antarctic Expedition, 1902-3, which called at Heard Island. Andrée was a pioneer of balloon flights in polar regions; he disappeared in the Arctic, in 1897. E. Aubert de La Rüe, a well-known French explorer, visited Heard Island, 15-22 January, 1929.

[4] *Abbotsmith Glacier Camp:* In August there had been a major reconnaissance of the central mountain of Heard Island, Big Ben (9,000 ft.), in preparation for a full-scale attempt in the summer. No expedition has, in fact, yet reached the summit crater. A well-planned private expedition is at present (October 1964) being mounted for another attempt.

over to South West Bay at first light, in the hope of finding him still there.[5]

General Note.—This extract from *Log for Lorna*, an illustrated diary addressed to the author's wife, follows on from that published in the April issue (Vol. 80 (12)). The scientific and popular names for the wild-life mentioned are: Giant Petrel, Giant Fulmar, Nelly, or Stinker (*Macronectes giganteus*); Dominican Gull (*Larus dominicanus*); Sheathbill or Paddy (*Chionis minor nasicornis*); Southern Skua (*Catharacta lonnbergi*); Cape Pigeon, a petrel (*Daption capensis*); Gentoo Penguin (*Pygoscelis papua*); Shag, Heard Island Cormorant (*Phalacrocorax atriceps nivalis*); Elephant Seal (*Mirounga leonina*); Leopard Seal (*Hydrurga leptonyx*); Ross Seal (*Ommatophoca rossi*).

[5] An illustrated diary extract, describing the Ross Seal, will appear later.

"Spotty"—In Memoriam

By K. C. Halafoff

Spotty, the best known Sherbrooke male Lyrebird, has not been seen since 6th of March, 1964. A nearly complete set of tail and wing feathers was found later in his territory, but the body, which could have made the identification possible by the albino marks on the chest, head and back, was not there. However, putting two and two together, it seems unfortunately certain that Spotty's brilliant career has come to an end. He was at least 22 years old at the date of his disappearance.

It did not come as a complete surprise. Four years ago I noticed first signs of his ailing. On a summer day I found him taking a nap on a log, with the eyelids closed. A few days later I saw him sleeping in the early afternoon—in a hollow formed by his digging for food in the shade of a fern—and that despite the presence of a fox fifty yards away whom my wife noticed and chased away. However, late in autumn I saw him again as agile as always, moving quickly with firm, energetic steps, but I did not forget those first warning signs. They meant that Spotty was approaching the end of his life span.

Such reckonings are naturally not much of a consolation to those who knew and loved him. He was the best singer and performer in Sherbrooke, and he was as tame and good-humoured as a Lyrebird can be. He was easy to find and to identify by those white spots on his plumage, but he could be unmistakably recognized from afar by his powerful voice of extreme clarity and beauty of tone-colour. He was quite fond of performing before a large human audience, and it was no rare occurrence to find him dancing on a mound in front of a semi-circle of spectators numbering up to a dozen and a half. His territory included nearly the whole length of the "firebreak", and it was mostly there that visitors, foreign and domestic, saw him dancing and singing on one or other of his numerous mounds, sometimes for as long as three-quarters of an hour.

I met Spotty about ten years ago when he was married to Smoky, a greyish-brown female. This happy union lasted as long as Smoky lived. They had then a chick whom we called Petty—a nice, but lazy youngster who, when already a year old, used to beg food from Smoky and, if she paid no attention, he forced her to feed him by literally riding on her tail. Both Spotty and Smoky appeared to give him dancing and singing lessons, but ballet "pas" were a problem, for Petty used to lose his balance when trying to lower his tail over his head, and

This photograph of Spotty by the author accompanied an article, "Musical Analysis of the Lyrebird's Song" in the March 1959 *Victorian Naturalist* (75, 174)

Smoky tried to show him how to do it properly.

However, one day I found the whole family deep in the Odel Gully and it looked to me that there was something wrong. Smoky was standing under an uprooted giant stump in the shade, her feathers ruffled; Spotty was singing at the top of his voice, sometimes walking over the stump, sometimes stopping in front of Petty; but Smoky remained immobile and looked definitely sick. Soon afterwards she died.

Spotty did not remain a widower for long; next year he married a big, nearly black female who was extremely untrustful as far as humans were concerned, so much so that she has built her nest about sixty feet above ground in a fork of a large Mountain Ash. She successfully reared a healthy chick, whom she later used to hide from visitors very efficiently, but Spotty apparently found her fear of humans incompatible with his idea of social life. So he divorced her, and his last spouse was a small, comparatively young female who was quite tame and was no hindrance to Spotty's public appearances. Unfortunately Spotty's latest known chick has been killed and eaten by two juvenile escapees from a local home, and thus the only certain trace of his brood has been lost for good.

Spotty has never been very particular about his territory, and very often some recently fully-matured young birds were seen feeding within its boundaries, obviously tolerated by Spotty who never chased them away. (He also used to visit his neighbours' territories frequently.) But it was not so with the "pool" in Odel Gully, a couple of tiny man-made ponds in the bed of an underground creek, which he regarded as his private bathroom. He invariably chased away any male who ventured to enter his bath, appearing suddenly as if from nowhere and forcing the intruder out, the latter leaving in rather a hurry. Then Spotty would have his bath, with much diving, splashing, and wagging and shaking of the tail. He would hop on a log afterwards and go painstakingly over his toilet, shaking the water drops off, tidying his beautiful plumage, and squeezing the lyrate tail-

feathers through his beak as through a wringer. Often he would afterwards jump down and have another bath—and another drying and combing.

His relations with neighbours were very friendly—especially with the male who lived near Sherbrooke Lodge and who was easily recognizable by his extremely long and nearly straight tail and slender body. The two birds were often to be seen at the edge of Clematis Avenue, the boundary of their territories, chattering, and then a mock chase with much running and even flying through the forest would follow, accompanied by a peculiar guttural sound. After a few minutes the birds would separate and start feeding.

Most of Spotty's activities were centered on the "Firebreak". In the morning he could frequently be seen walking slowly along the track, and then entering the thicket of bracken ferns where some of his mounds were hidden. Soon a clear sonorous voice would be heard from the thicket, and another music-lover's hour would begin. From about a quarter past eight until eleven o'clock he would visit several mounds in succession, giving a performance on each of them, and then descend deeper into the forest below to feed. The afternoon timetable was uncertain and sporadic: sometimes quite long bursts of song would occur at any time between two and six o'clock, but a siesta from eleven till two in the afternoon was usually observed, except during the mating season.

In the moulting period in spring, Spotty used to rehearse now and then some new items; it was really a thrilling thing to hear. Several times during that period I heard from him the equivalent of a counterpoint when he successfully and with a refined musical taste combined simultaneous utterances of two different birds in a sort of two-parts invention. Strangely enough, I never heard from him these rehearsed novelties later in the year, though they were unquestionably beautiful.

By mid-December Spotty's tail was again fully grown; he used to carry it very carefully as if it were a crinoline. Regaining his beautiful adornment prompted him always to sing, and during the next three or four weeks he would give a series of lovely concerts. It was during this summer singing period that he had the largest audiences listening to him, especially during the Christmas holiday. Contrary to the idea of getting up in the dark on a cold winter morning and shivering later in the wet wintry forest, it was a real pleasure to enjoy the same Lyrebird programme with dance and song in the hospitable warmth of a fragrant summer day at Sherbrooke.

There was something regal in Spotty's bearing, in the way he used, having finished the performance and folded his tail, to walk away past the spectators who were still standing in a transfixed state; it was felt how sure he was that nobody would do anything to him to injure his sense of dignity.

I was often called upon to serve as a guide to a distinguished tourist or to a group of tourists, domestic and foreign, and Spotty has never let me down. My friendship with him had developed to such an extent that he would come to me from wherever he was in the forest on hearing me shouting his name—a trick I have demonstrated to some of my friends more than once. If, however, I did not try to find him, he often found me on his own accord, and then remained for quite a while in my vicinity, feeding and singing. He was apparently unaware of the fact that there was a limit to the volume of sound which a human ear can stand without strain, and a

friendly serenade at three feet distance often made my eardrums behave like an overloaded microphone.

Of all visitors whom I have taken to Sherbrooke, Spotty never had a keener "fan" than the late famous conductor, Dr Nicolai Malko. It was on a misty Sunday morning when we, accompanied by Mrs Malko, entered the "Firebreak" and heard that wonderful, unmistakable Spotty's voice singing one of his best compositions somewhere nearby in the forest. We stood and listened at about twenty-five feet distance from the yet invisible bird. In another twenty minutes, to Dr Malko's immense pleasure, Spotty finished his concert and came out to our track with a friendly inquiring look, and stayed near us for some time while Dr Malko was lost in admiration of his beauty and grace. On the way back Dr Malko commented warmly about the clarity of Spotty's voice and the intricacy of the song from a musical point of view, and I suggested that we might hear Spotty once more from my records of his song at home. So, after dinner, we sat and listened for another hour to Spotty's voice until Dr Malko nearly missed his evening rehearsal.

Spotty also figured on the screen; about six years ago I completed two 8 mm. colour films on Lyrebirds' lore in which Spotty appeared as a main personality. His screen debut occurred when these films were shown at the National Museum Theaterette. His fame may probably survive him for quite a while, as at Cambridge his film is at present being "blown up" to 16 mm. for the University's library. Several other films of Spotty were made and shown by movie amateurs, both in black and white and in colour.

From a purely musical point of view, most of the Spotty's songs were masterpieces. His use of "anti-monotony" principle was remarkable, and the end of a half-hour performance always left one wishing for more. He continued to improve on his song until the end of his life. In December 1963 during my annual holidays I recorded 750 feet of his song on a tape, and so his latest achievements are preserved for posterity: a new version of Butcher Bird and of Rosellas and especially an extended "stanza" with a rare beauty of melodic tone, finishing with five ascending tremolando trills instead of the usual three.

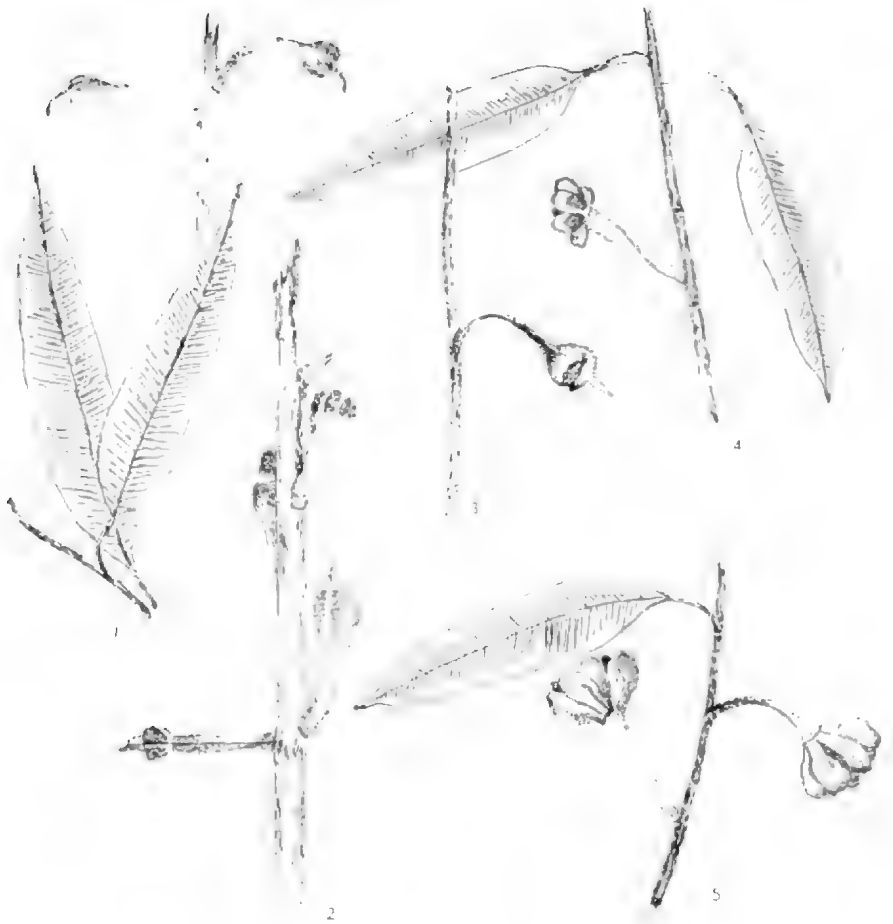
It is hard to imagine Sherbrooke without Spotty, to realize that the forest will no more resound with that powerful sonorous clear voice, and that his lively black eyes will never again look into mine. But he did not live in vain; his was a glorious life, and he has become a historic personality. Of all Sherbrooke Lyrebirds he was the only one known to visitors by name; people flocked to the "Firebreak" to see and to hear him. Within his home forest he was certainly the greatest tourist attraction. More flash shots were taken of him than of famous politicians, and his name appeared in numerous articles on Lyrebirds. A chorus of exclamations of admiration or of ecstatic whispers accompanied his public performances. It was his morning song on the branch that was recorded on Columbia 7 in. disc, "The Superb Lyrebird"—a fitting name indeed. To add to this successful career, not long before his final disappearance he was filmed on television and as "Dancing Orpheus" has become known to world-wide audiences. All this is not a small achievement for a bird, even for a clever one as Spotty certainly was, and his fame exceeded by far that of his predecessors—James and Timothy; and now together with them he has joined the rank of immortals, to live for ever in the memory of all Nature's lovers.

A Northern Eucalypt

By Jean Galbraith

I have already (*Vict. Nat.*, July 1957) drawn attention to the fused bracts which enclose the umbels of *Eucalyptus kitsoniana* until they are fairly well developed. From time to time I have been interested to see the same character in other species, including *E. delegatensis, E. botryoides* and *E. preissiana.*

Close study would probably show



Eucalyptus miniata A. Cunn.

leg. N. Walker, between Alice Springs and Darwin, May 1964

1. Leaves, and umbel of buds enclosed in fused bracts.
2. Shape of buds showing through covering.
3. Covering torn by expanding buds.
4. Buds free from covering. Torn remnant of covering at base. Not glaucous. (Note flattened and twisted peduncle).
5. Buds spreading, but still partly compressed. Becoming glaucous.

Eucalyptus miniata

6. Mature umbel of rounded buds.
7. Opercula ready to fall; flowers and flattened peduncle.
8 & 9. Urceolate fruits.

Painting—*C. Jacobson*

this character to be fairly widespread, but it is certainly not universal. *E. radiata*, for example, has naked umbels from when they are so small that they can just be recognized as flower-buds, and *E. nitens* is a typical example of another group which has the very young bud-clusters enclosed in two deciduous, lanceolate bracts which fall while the buds are very small.

Recently a series of specimens of the flaming orange *E. miniata* of northern Australia was sent to me from Darwin, and in this species the enclosing fused bracts were very conspicuous.

Amongst several eucalypts sent were two pieces which I put aside as separate species because one appeared to have very large, narrow, rostrate, solitary buds and the other small ovoid blunt buds in umbels of 7, although the leaves, the broad flat peduncles

and the white "bloom" which rubbed off like chalk, were alike on both specimens.

If the collector (Mrs Walker of Port Augusta) had sent less complete material, nothing but dissection of the large buds could have shown that both "species" were the same, the buds consisting each of one umbel completely enclosed in a thin wrapping, which does not break regularly but is torn into ragged fragments by the developing buds.

Because of the completeness of the material sent I was able to enjoy tracing the development from immature and enclosed buds to orange flowers and light brown fruits shaped like Ali Baba's oil jars (urceolate).

In the accompanying drawings Mrs Jacobson of the Latrobe Valley F.N.C. has illustrated the phases of development as I could not do.

The Bendigo-Rushworth Excursion— 3-4 October 1964

The kind of weather prevailing in Victoria scarcely entitled anyone to expect the sunshine and warmth which made this excursion, under the joint leadership of Messrs R. R. Dodds and J. R. Garnet, such a rewarding and happy event.

The big tourist coach carried a capacity load, and by the time that the excursionists reached Bendigo on the Saturday evening, private cars and their passengers had swelled the party to something like 70, and the number increased even more when we reached Rushworth on the Sunday morning. There we were joined by several car loads of naturalists from Benalla and, of course, interested folk from Rushworth itself.

It seems that Rushworth is now accustomed to invasions of this sort. Since the F.N.C.V. excursion to that locality in the spring of 1948 (*Vict. Nat.* 1949, **65** (10): 224-237) the inhabitants have become very conscious of the attractiveness of the natural resources and historical associations of the district, and the residents go to no end of trouble to encourage visits by organized parties so that these attractions can give pleasure to others besides themselves and it helps to keep the town alive.

However, before we say any more about Rushworth, we should refer to the Saturday journeys.

The route was via Kilmore and Heathcote. An interlude at Derrinal provided one of us (R.R.D.) with an opportunity, while the party was assembled on a steep grassy hillside overlooking an arm of water at the northernmost extremity of the Eppalock Lake, for discoursing on the geological history of a district renowned for the abundance of exposed Cambrian rock. Here we surveyed the

The "Stranger Rock" at Derrinal near Heathcote.

Photo: *J. Ros Garnet*

famous "Stranger Rock"* and any number of lesser stones dropped in Permian times by a passing glacier. The few anglers, who hopefully dangled their lines in the waters of the lake below, must have been intrigued at the spectacle of 40 or 50 people gazing earnestly at a 30-ton granite boulder or plodding about examining little loose stones for striae and other evidences of glacial grinding and polishing.

The best collecting grounds for such objects of interest now lie under the waters of Eppalock Lake, which have drowned large areas of the valleys of Wild Duck and Mount Ida Creeks. A remarkable variety of minerals could be picked up in the beds of these streams, every successive flood producing a fresh layer for such as cared or chose to fossick among them.

One thing to be noted is that the "Rock" is much more easily approached than of yore, because the creation of the lake made it necessary to re-route the Bendigo road. The new road lies within a few hundred yards of the "Rock". The old road, now under water, was half a mile or so to the south.

From Derrinal and its glacial stones the party moved on to the Eppalock Weir where the F.N.C.V. contingent was met by our hosts for the rest of the day, members of the Bendigo F.N.C., Messrs Babb (President of the Club), Graham Marshall (Hon. Secretary), Frank Robbins and Miss Elsie Flanagan among them. After a picnic lunch in the shelter of a quarried rock face, which revealed a good example of a syncline, an inspection was made of the unattended hydro-electric turbine generators and pumping station and the "motorcade" (as it had become), then moved off towards Axedale and Fosterville to examine: (a) a section of the geologically renowned Axedale Fault, known as Hunt's line, and (b) the profusion of wildflowers in the forests of the nearby Ordovician formation.

Without the aid of a carefully drawn map it would be difficult to pinpoint the several stopping places along the forest roads from Fosterville to Bendigo. Forest roads are not designed particularly for sight-seers or naturalists, and hence they do not appear on ordinary road-maps. Under the guidance of the Bendigo leaders the party was enabled to examine many especially attractive places along these roadsides. Birds were not remarkably evident, doubtless because of the wind and occasional showers of rain, but the bird observers were satisfied that a quiet ramble in these places, under more favourable conditions, would soon have produced a sizeable bird list. Botanists and wildflower admirers noted with pleasure the abundance of orchids—the purple Waxlip being an especially eye-catching feature of the shrub-packed landscape. The shrubs included Common Fringe-myrtle, Silky Tea-tree, a Geebung (*Persoonia rigida*), several species of *Acacia*, *Grevillea* and *Olearia* (Daisy-bush).

Towards the end of the day the party separated into groups and made their several ways to Bendigo by devious routes. One small group had the pleasure of seeing *in situ* one of the rarities of the district—a double-flowered (8-petalled) form of the Fairy Waxflower and, as well, plants of the pink-flowered aromatic Hairy Boronia. Another group negotiated some miles of flooded road without mishap to be shown roadside forests made bright with such plants as the Bitter Cryptandra, an unusual form of the Rosemary Grevillea and an abundance of Pink-eye, Guinea-flower, Daisy-bush and, of course, countless Waxlips and various Caladenias.

The Bendigo F.N.C. has diligently continued the work begun by D. J. Paton forty years ago (see *Vict. Nat.* 1924, **40** (10): 189-204) and extended by J. W. Audas (ibid. 1936, **52** (10): 181-184) and that club's records of plant distribution in the Bendigo district are not likely to be matched for completeness by such records as are kept in other districts. Consequently there is no need to append long lists of plants seen during this excursion. They are already recorded. However, it is worthwhile recording that the spring of 1964 has been one in which native plants have flourished in exceptional profusion due, possibly, to a long resting period in the preceding summer and the stimulating effect of an uncommonly wet winter.

After dinner at the Golden Hills motel

* The Stranger Rock has been pictured only once before in *The Vict. Nat.* (1925, 42 (4), 102) where the photograph of it accompanied a short note on a visit by F. G. A. Barnard and three other members of the Club. One of them—Mr. V. H. Millar—is, happily, still with us. The old half-tone block seems to have disappeared, but the new one, made from a photograph taken on this 1964 excursion from much the same position on the hillside, reveals that the intervening years have made little impression on the "Stranger Rock", although the environs have changed considerably.

Aboriginal Water-well at Whroo.

Photo: *J. Ros Garnet*

the bus and its passengers proceeded to the School of Mines to hear an illustrated address by one of us (J.R.G.) on Victorian National Parks and their contribution to the preservation of scenery. The evening, which had been arranged as a special public meeting of the Bendigo Club, was attended by a large and attentive audience. Both the speaker and (it is hoped and believed) his listeners enjoyed the meeting. It is a tribute to the endurance of field naturalists to note, that despite whatever weariness they hay have felt after a long and busy day in the field, they showed every evidence of remaining awake until they returned to the motel after a concluding conversazione and supper provided by the host club.

Early enough on the following morning the party, with a strong contingent of Bendigonians, headed towards Rushworth via the Colbinabbin Ranges. There were two programmed stops *en route*—the first to examine a stand of ancient Acacias in a grassy roadside paddock. Mr. Robbins felt sure that these trees represented an undescribed species having affinities with the Wirilda (*A. rhetinodes*). It appears to be a summer-flowering species which, perhaps, accounts for the fact that its seeds or fruits have not yet been collected for the purpose of botanical identification.

Further along, a little beyond Goornong, a colony of multitudes of Golden Moth orchids were noticed flowering on the railway reserve. The bright spectacle suggested to Mr Marshall that the Railways Department should be asked to allow that particular stretch of the reserve to remain undisturbed as a wildflower sanctuary. A normal practice is to lease sections of railway reserves for small crops. Several such leaseholds are operative in the vicinity of the orchid patch, and, if the Bendigo Club successfully follows up the suggestion, it will deserve the gratitude of hosts of admirers of our native plants.

The second stop was to examine a roadside quarry in the Colbinabbin Ranges. This quarry, once a source of road-making stone, is of interest as exposing Cambrian rock so decomposed as to be quite friable. It crumbles readily under hand pressure, coming away in layers. With some patience and industry large boulders can be reduced to tennis ball size in next to no time (which is not surprising in view of the fact that it was formed anything from 400 to 600 million yeas ago). Across the road from the quarry is another interesting feature of the landscape. The Soil Conservation Authority has established an experimental hillside plantation of native trees and shrubs to demonstrate a method of prevention and treatment of sheet erosion and gullying in a district where both commonly occur. Very pleasing and effective the method seems to be. The plantation is surrounded by a rabbit-proof fence and can be entered only by climbing over a stile. The absence of grazing and browsing has resulted in the growth and persistence of a dense ground-cover of grass within the enclosure, which is in striking contrast to the well-grazed, treeless and shrubless paddock on the other side of the fence where the grass would average about an inch in height. Sheep and rabbits make all the difference.

We reached Rushworth on schedule, and there met our companions from Benalla and our well-remembered friend and guide on the occasion of our 1948 visit—Mr Ken. King, now Secretary of the Rushworth Waterworks Trust. He introduced the District Forest Officer, Mr Charles Fleming, who warmly welcomed the party to the district and, with other residents, we were soon on our way to Growler's Hill, Rushworth's wildflower garden just at the back of the town.

The crowd became rather dispersed in the mallee. Some followed Mr King; others followed Mr Fleming; others followed nobody in particular, but those who happened to be about were delighted to see several colonies of the Flying Duck orchid (not yet in flower) and, later on, the pride of Rushworth's wildflower admirers—several specimens of the rare "Beardless" Bearded Orchid (*Calochilus imberbis*) in bloom. Other much admired plants included Fringed Heath-myrtle, Daphne Heath, Crimson Mintbush and White Marianth.

As mentioned in the second paragraph, Rushworth is proud of its historical associations with the gold mining era. The brief scramble about Growler's Hill brought in its train an appetite for lunch and, as the day was delightfully warm and sunny, it was so arranged that lunch would be available at Whroo, about five miles away. So in that direction the party moved, passing on the way a freshly-painted finger post which carried a direction to traction engines to whistle at that point along the road. Perhaps half a century had passed since a traction engine emerged from the bush at that spot!

Close to the now-vanished gold-mining township is another relic of the past restored to serviceability by local historians, a bullock- or horse-operated puddle machine. The cyanide plant building seen in 1948 has gone. So has the poppet head of the Balaclava Mine and the Mechanics Institute-School. However, Balaclava Hill and its big hole is still there and the network of tunnels at the higher levels are still being "worked", for quartz crystal now instead of gold, by all sorts of people interested in good quality quartz crystals. Several small specimens were picked up in the gravels and old heaps of over-burden by members of our party.

The luncheon at Whroo was a most pleasant interlude, made the more so through the kindness of the Rushworth Band Ladies' Auxiliary. They, with the help of Mr and Mrs King, set up tables in the field where part of the township once existed, and dispensed, at a nominal charge, tea, sandwiches and cakes to all who wanted refreshment. Their kind attentions merited the vote of thanks which was moved at the end of the break. Before leaving our friends at Whroo the party, now grown to something like 70, was given an account of the early days of the Rushworth-Whroo gold mines by Mr Parris, who has given much attention to this fascinating subject over a period of many years acquaintance with the district.

Luncheon was followed by a visit to the Balaclava hole and, guided by Mr Fleming, the party then moved off to a section of the State Forest known as "The Buffalo Block" in memory of the Buffalo gold-diggings. It is a Red Ironbark forest and notable for an abundance of Fairy Waxflower as well as the almost inevitable *Calytrix* (Fringed Heath-myrtle). If Mr Fleming has his way, there will be no careless harvesting of timber in this part of the forest, for there are plenty of other very delightful and showy wildflowers growing with the Waxflower. Forest roads have made it fairly accessible to the public, and it could well happen that, even though timbermen may not be permitted to destroy this natural garden, the density of tourist traffic may do so. One of us was obliged to warn a visitor (who, of course, was not a member of our party) that there is a Wildflower Protection Act and the Fairy Waxflower, of which he had an armful, was specifically scheduled as a plant protected under that Act. What happens when a Forest Officer is not in the vicinity is not hard to imagine.

This offence paled into insignificance beside another which occurred later in the afternoon when we had returned to Whroo to visit its famed aborigines' water well in a rock stratum on a hilltop near the Old Cemetery. Another group of visitors to the well, local people as it happens, had set alight to a flourishing Grass-tree, just for the fun of seeing it burn. There was another specimen nearby, but some other vandal had already burned it. This was such a blatant act of vandalism to perpetrate in part of a State Forest established as a reserve of some scenic merit and considerable ethnological interest, that one of us who, for many years, has been an Honorary Forest Ranger, considered that more than an admonition was warranted. The Forest

Officer was asked to take the name and address of the culprit and take further action.

It is not often that acts of this kind are detected. They leave behind a sad impression and pose the question: "How comes it that ordinary respectable citizens need to be persuaded to have some regard for the aesthetic values of the scenery they despoil and seem to have so little regard for the property which they share with every other citizen of the State?"

By about 5 p.m. we were on our way again, still guided by Mr Fleming, to Reedy Lage on the road to Nagambie, a road, like those in the Fosterville forest, awash with water in many places. However, the pools were negotiated without incident. Near Reedy Lake we looked for the aboriginal canoe trees which had been seen sixteen years ago. We missed them, doubtless because we were on a different road from that traversed that time, but Mr Parris piloted us to the vicinity of one good specimen, an ancient River Red Gum standing in the water of the lake close to the road. It was duly photographed in the waning light of what had been a brilliant afternoon and, after a refresher of tea and sandwiches (provided by the ladies of Rushworth) and a word of farewell to the Rushworth District Forest Officer, we set our sights on the road ahead to Melbourne and its distracting hurly-burly.

And so ended a weekend of strenuous field work.

The Vice-President of the F.N.C.V. (Mr A. J. Fairhall) rather embarrassed the two leaders by conveying to them an expression of the appreciation of the party for a weekend, the organization of which had happened to work out very nicely indeed. Although we may not have said so explicitly when replying to this unexpected tribute, both of us recognize and now take this opportunity of recording in print our belief, shared by every F.N.C.V. member who has taken part in a Club excursion during the past 10 years, that the person most responsible for their good organization is the Club's Excursions Secretary—Miss Marie Allender.

J. Ros Garnet

Field Naturalists Club of Victoria

General Meeting—January 11, 1965

Before the Ordinary Meeting, an Extraordinary Meeting was held at which the resolution was put and carried *nem. con.* that the Seaford Foreshore Preservation League be affiliated with the Field Naturalists Club of Victoria.

About 100 Members and friends were present when the President, Mr. M. K. Houghton opened the Ordinary Meeting. The Minutes of the December General Meeting were taken as read and confirmed. In the absence of Mr. Coghill, Mr. A. Fairhall acted as secretary and, after reporting that a Seminar on Wild-Life Conservation was to be held at the University of New England on January 22-25, he invited any Members attending the 38th. Annual Congress of ANZAAS in Hobart on August 16-20, 1965, to contact the Secretary so that two accredited delegates from the Club could be nominated. Mr. Fairhall mentioned the Photoflora Competition (details of which were given on page 244 of the January *Naturalist*) and then announced that, as there had been no Council Meeting in December, there would be no election of new Members.

The subject for the evening was "Members' Night—Reminiscences" and a most interesting programme, necessitating a brief interruption of the epidiascope's long hibernation, had been arranged by Mr. E. S. Hanks. The first speaker, Mrs. Hanks, described a camp-out at Cape Woolamai 36 years ago, the first "mixed" camp-out in the Club's history, and showed photographs of groups of members who attended. Mrs. E. R. Bennett followed with her personal reminiscences of natural history excursions and F. N. Clubs in Ballarat and Geelong. Her interest in natural history had been greatly stimulated by Mr. Hart. After being a member for 18 years she attended her first meeting of the F.N.C.V. on a foggy night in 1936. Mr. Ros Garnet, Custodian of Club Property, produced some interesting old documents including a contemporary Melbourne newspaper's two-page account of a Club excursion to King Island in 1897, the Club's Minute Book for 1892 and a

number of photographs of Wilson's Promontory taken between 1905 and 1923.

Miss Lynette Young showed a number of transparencies of wildflower decorations arranged in a Melbourne bank by the late Mr. Tarleton Rayment during 1956. She also displayed a portrait by Robert Hofmann of the late Mr. H. Dickins, a picture that had been presented to the Club. Mr. Garnsey Hooke spoke to colour-transparencies of Mr. Aubrey Chalk, the Club's President in 1939-'40. Mr. Hugh Stewart mentioned one of his very early memories, the Sale State School's flag flying at half-mast in 1896 for Baron von Mueller. Mr. Stewart had been elected a member in January, 33 years ago, when amongst the assembly was the frock-coated Edward John Dunn, then nearly 90 years old and best remembered now by the marble staircase in the National Library. Mr. Stewart read a nature note contributed by Dunn to the September 1923 issue of the *Naturalist* in which he mentioned seals in the flooded Murrumbidgee in 1856 and suggested that these animals were the basis of the Bunyip stories.

Mr. Jim Willis, who also was elected a member 33 years ago, spoke about Charles French who joined the Club in 1882 and who, for 13 years, had worked with Baron von Mueller. Although he wrote little himself, French had been a noted leader of excursions and a great teller of tales. Mr. Willis mentioned that the first colour-photographs were shown to the Club in 1938 by Mr. Fred Lewis. Mr. Hanks concluded the programme by showing some technically excellent lantern slides of egrets made by Arthur Mattingley 60 years ago. The photographs illustrated the sad story of the slaughter of egrets for their then-fashionable plumes and were utilized in the campaign by F.N.C.V. and many other organisations in the successful fight against the plume trade not only in Victoria, but in Holland and many other overseas countries.

The President thanked Mr. Hanks, Mr. Curtis and all the speakers for a most enjoyable evening.

With the consent of the President, Miss M. Moon addressed the Meeting on behalf of the Save the Dandenongs League. The League asked for support for its opposition to the proposal of the Tourist Development Authority to build a gasometer-like café, 80 feet in diameter on the summit of Mt. Dandenong

and to construct roads wide enough to enable tourists in parked cars to enjoy the view.

Mr. Ros Garnet and Mr. Woollard spoke in support of Miss Moon. The President said that Council would discuss what action should be taken by the Club at its next meeting.

Mr. Jim Baines spoke on an historical exhibit that he had placed on the table. Among the items displayed was a bound volume of the *Naturalist* for 1930-'31, that had belonged to Mr. E. Pescott and in which was affixed a copy of the menu for the Jubilee Dinner of the Club held on July 16, 1930. The card had been autographed by many old stalwarts of the club. In 1940 Mr. Pescott had written a history of the Club adding to the earlier accounts by Mr. C. Barrett published in 1905, 1920 and 1930.

Among non-historical exhibits on the table were a flowering spray of *Tristania conferta* and a specimen of the Horned Orchid from Deep Lead near Stawell. There was also a fine specimen of *Laurentia petraea* growing in a pot.

WILDFLOWER SLIDES

The Native Plants Preservation Society reminds you that entries for their photographic competition, "Photoflora 1965" close on 22nd February. Entry forms are still available from the Competition Secretary, Miss B. Terrell, 24 Seymour Ave., Armadale.

F.N.C.V. DIARY OF COMING EVENTS

GENERAL MEETINGS

Monday, February 8, 1965—At the National Herbarium, The Domain, South Yarra, commencing at 8 p.m. sharp.

1. Minutes, Reports, Announcements, Correspondence.
2. Subject for the Evening: Mr. E. S. Hanks, "Trees and Birds".
3. Election of Members.

(a) *Ordinary Members*:
Miss J. Clemens, 38 Adelaide Street, Armadale (Introduced by Mrs. J. Frankenburg.)
Mr. W. E. Drory, 5 Karo Court, Doveton (Interest: Geology. Introduced by E. R. Allan and Mary Morgan.)
Mr. R. Fowler, 50 Powell Street, Yarraville, W.13 (Interest: Microscopy. Introduced by D. E. McInnes.)
Mr. D. L. Jones, 7 Yunga Road, Balwyn (Interests: Botany, Orchids.)
Miss B. Mentiplay, 5 Foam Street, Hampton (Interests: Botany, Orchids.)
Mr. K. W. G. Richardson, 21 Kincumber Drive, Croydon.
Miss C. Stewright, Box 8, Parkville, N.2. (Interests: Geology, Botany.)

(b) *Country Members*:
Mr. B. Clifford, 64 McCallum Street, Swan Hill.
Mrs. M. Houghton, 25 Fairfax Road, Bellevue Hill, New South Wales.
Miss G. M. Redfern, Kitchen Street, Mansfield.

4. General Business.
5. Nature Notes and Exhibits.

Monday, March 8.—Mr. A. Mitchell, "Conservation and Vegetation".

GROUP MEETINGS

(8 p.m. at National Herbarium, unless otherwise stated.)

Thursday, February 11—Botany Group—Miss H. Ashton will speak on "Aquatic Plants of Victoria".

Wednesday, February 17—Microscopical Group.

Friday, February 26—Hawthorn Junior Club—At Hawthorn Town Hall, 8 p.m. Mrs. Van Rompaey on "Marine Worms".

Monday, March 1—Marine Biology and Entomology Group—At Mr. Strong's rooms, Parliament House. Enter through private entrance at S. end of House, 8 p.m.

Wednesday, March 3—Geology Group.

Thursday, March 4—Fauna Survey Group—At Fisheries and Wildlife Department, at 7.45 p.m.

Thursday, March 11—Botany Group.

F.N.C.V. EXCURSIONS

Sunday, February 21—Mooroodue and Mornington Peninsula. The coach will leave Batman Avenue at 9 a.m. Fare 18/-. Bring two meals.

Field Naturalists Club of Victoria

Established 1880

OBJECTS: To stimulate interest in natural history and to preserve and protect Australian fauna and flora.

Patron: His Excellency Major-General SIR ROHAN DELACOMBE, K.B.E., C.B., D.S.O.

Key-Office-Bearers, 1964

President:
MR. M. K. HOUGHTON
20 Trevascus Street, Caulfield (58 1937)

Vice-Presidents: MR. E. BYRNE, MR. A. FAIRHALL.

Immediate Past President: MR. D. E. McINNES

Hon. Secretary: MR. E. H. COGHILL, 15 Baker Avenue, North Kew (85 4413).

Hon. Treasurer: MR. A. G. HOOKE, 400 Collins Street, Melbourne, C.1 (60 1919; after hours, 83 5080).

Hon. Editor: MR. J. R. HUDSON, 16 Alma Street, Essendon, W.5 (337 8778)

Hon. Librarian: MR. P. KELLY, c/o National Herbarium, The Domain, South Yarra, S.E.1.

Hon. Excursion Secretary: MISS M. ALLENDER, 19 Hawthorn Avenue, Caulfield, S.E.7.

Hon. Sales Officer: MR. E. R. ALLAN, c/o National Herbarium, The Domain, South Yarra, S.E.1.

Group Secretaries:

Botany: MR. F. ZIRKLER, 134 Kangaroo Road, Oakleigh, S.E. 12 (56 4337).

Geology: MR. R. R. DODDS, 5 Banchory Street, Essendon (379 4309).

Microscopical: MR. P. GENERY, 7 Rollings Road, Upper Ferntree Gully. (Phone: Ferntree Gully 587.)

Fauna Survey: MR. R. H. J MCQUEEN, 262 Nepean Street, Greensborough (43 4439)

Entomology and Marine Biology: MR. J. W. H. STRONG, Legislative Council, Parliament House, Melbourne, C.2.

MEMBERSHIP

Membership of the F.N.C.V. is open to any person interested in natural history. The *Victorian Naturalist* is distributed free to all members, the club's reference and lending library is available, and other activities are indicated in reports set out in the several preceding pages of this magazine.

Annual rates are:

Ordinary Membership	40/-
Country Membership (over 20 miles from G.P.O., Melbourne)	30/-
Junior Membership (under 18 years)	25/-
Subscription to the *Victorian Naturalist* (non-members)	30/- (post free)

Note: The currency of the present club year and Volume 81 of the *Victorian Naturalist* is from May 1964 to April 1965.

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2/6

Magnificent stand of White Mountain Ash, *Eucalyptus regnans*, in the Marysville State Forest

FORESTS COMMISSION VICTORIA

. . . . . preserving the beauty of our forests for your enjoyment.

Vol. 81, No. 11

F.N.C.V.

March 4, 1965

The Victorian Naturalist

Editor: J. R. Hudson, B.Sc., M.R.C.V.S.

Assistant Editor: R. H. J. McQueen, B.Sc., Dip.Ed.

CONTENTS

Front Cover:

The photograph of a family of seals on Lady Julia Percy Island is by Trevor Pescott and is one of the series illustrating his article on the fauna of this island (pages 290-301 of this number).

Bush Brushes

The fox's brush was the traditional trophy of the chase. The Field Naturalist usually returns from an excursion into the bush with a different sort of "tale". If you have one worth mounting and preserving send it to the Assistant Editor, "Victorian Naturalist", 262 Nepean Street, Greensborough.

Magpie Nesting Activity

The following notes have been sent in by Mrs Vera Greaves of Lang Lang.

Two seasons ago, a pair of Magpies built their nest in a eucalypt very close to our diningroom window. We had a wonderful opportunity of watching the building process and the rearing of the young, both of which were subsequently killed by cars.

During the nesting period, the male bird became vicious and would not allow me to go into the yard without swooping down upon me, although he never attempted to molest my husband and son. I eventually outwitted him by wearing my husband's hat.

Last season, the pair cleaned out the nest, throwing out a number of sticks and leaves and relined it. Again they reared their brood and again both of the young were killed before learning to fly properly. The male became very friendly throughout that nesting period and would come right to the door to be fed—a complete reversal of his former behaviour.

Early in July this year, the same magpies cleaned out the nest, but up till now, they have not proceeded to breed. They are both on the lawns all day searching for grubs and worms, so I am sure they have not built elsewhere.

Is it that magpies do not breed every season, or is it because of losing their young they find it futile to try to raise offspring?

This is an interesting behavioural note in that a complete reversal in male behaviour has been observed. It is possible that it might not be the same male bird concerned, but again much has to be learnt regarding animal behaviour and the various stimuli concerned.

With regard to the query in the last paragraph, the only suggestion I can offer is that the recognized breeding season for these birds is from July to February, and that this season, breeding may be slightly delayed. Sometimes, with older birds, non-fertile eggs may be produced. Reproductive cycles in animals are rhythmic and under the influence of temperature and day-length or photo-period, and as such it is not possible for the birds to cease breeding simply due to the loss of offspring. It is most likely that the necessary environmental stimulation of the breeding period has been delayed beyond the previous two seasons.—R.H.J.McQ.

The Lilac Orchid

Following the revision of this species in the *Vict. Nat.* 81 (5), two letters have been received. The first is from Mr. A. H. Chisholm.

Arising from the recent critical revision of the orchid species *Diuris punctata*, it may be appropriate to record that this plant is still flourishing in some few spots about 30 miles west of Sydney in shale country near Windsor.

I saw there on September 19 two colonies about a mile apart, each containing a large number of plants in full flower. They were the largest assemblies of the kind I had seen since the occasions when, rather late in each year we used

to admire similar blooms beside the railway near Beaconsfield, east of Melbourne.

It is curious that the plant grows in such isolated colonies. In each of these latest instances the area occupied was only about 50 yards long and a dozen yards wide. Outside those two spots, although conditions nearly appeared to be precisely the same, not a single orchid could be found.

Colours of the flowers ranged from light purple through various shades of lilac to (in one example) pure white. The greatest height of a stem was about 18 in.

On the whole, it would seem that Rupp's vernacular name, Lilac Orchid (or Lilac Double-tail) is more fitting than Pescott's Purple Diuris. Pescott, it may be noted, was justified in referring to the species as "one of our most beautiful of orchids", but he had less warrant for regretting the loss of the synonym *elongata* in favour of *punctata* on the ground that "the flower is not spotted". In fact, although spots are not immediately noticeable in the flower, when it is held up to the light an abundance of them may be seen.

Mr. Chisholm's reference to the colony of *D. punctata* at Beaconsfield recalls to mind an attempt to preserve some of these orchids. Just prior to the duplication of the South Gippsland railway line, a group of orchids was removed together with a large amount of undisturbed soil and transplanted to Brighton. Although the plants continued to produce a few blooms for several years, the change in environment finally proved too much and they died.

The second letter is from Miss M. N. Elder of Kallista and indicated a greater success in transplanting this rather spectacular species.

After the interesting revision of Diuris species in the *Vict. Nat.*, it is not necessary to comment on my frustration with the complex variations.

In 1952 I snatched two plants of the fine Purple Diuris from the path of the bulldozers near Beaconsfield. Kept in a pot with the original soil, these have flowered every year. Once they were overwatered and one plant failed to flower, but it came up as usual the next year.

Early last year I moved from Malvern to Kallista and planted them in the garden here. They are not doing as well and are a little later sending up the flower stems. Is it too cold at an altitude of 1400 ft.?

There are so many things to be learned about these, and indeed about all our Victorian orchids. How long does each plant live? How are they fertilized? If by an insect, what kind? Have they been grown from seed?

The two Diuris are now twelve years old, plus how many years before I got them! They have produced seed, but I have not managed to grow any from the seed.

Several times over the years the old "orchid spot" at Beaconsfield has been visited. Once I counted about one hundred flower stems, so they survived the rail duplication, but on the last visit, hardly any could be found.

It seems that almost the last few *Diuris alba-violacea* are in the N.P.P.S. sanctuaries near Sydenham, where a few active members struggle to keep them in as near as possible to their natural habitat. All this land has been so long grazed, topdressed, replanted and burnt, it is a wonder any survive. Let us hope we can win the struggle here and the plants will be preserved for future generations.

Many of the questions posed by Miss Elder are unanswerable because few ecological studies, if any, have been carried out with these plants. However the question of later flowering demonstrates an interesting point. Possibly temperatures at this altitude (1400 ft.) may prove too low for the plants to succeed, but aside from this, some research has been conducted into the variation of flowering periods.

From this, it has become apparent that for any species which is widely distributed along a vertical transect, altitude greatly affects the time of flowering. As the altitude increases, this time is progressively delayed. As an approximation, an increase of 1000 ft. in altitude delays flowering from 7-10 days.

R. H. J. McQ.

A Visit to Lady Julia Percy Island

By Trevor Pescott

Introduction

Lady Julia Percy Island is a flat-topped basaltic island about twelve miles west of Port Fairy in south western Victoria. Here, there are several major attractions to naturalists —nesting seabirds, seals and unusual plant associations; and it was with the intention of a brief study of these that members of the Geelong Wildlife Research Group combined with other naturalists to undertake a visit during December 1963.

The planned date of departure was the 27th December, but inclement weather delayed us for a day. We left Port Fairy in the "Charles Whitton" a fishing boat of some forty-five feet length skippered by Mr. S. Tyson, on the 28th with a departure time close to 8.00 a.m. and a two-hour journey ahead of us. A heavy swell of previous days had largely subsided, but there was still sufficient "water" to cause sea sickness to half the party. We offloaded all our equipment from the "Charles Whitton" by dinghy, a task that revealed the skill of the boatman who beached us safely a dozen times amongst beam-shattering rocks on a sandless beach.

About 8.00 a.m. on New Year's Eve, after a long night of mist-netting and photographing, we were aroused from lethargic contemplation of uninteresting breakfast by the call— "the boat's here". Actually she was half-an-hour off shore but thoughts of food were dispelled as we hastily broke camp.

Two hours of loading and an hour-and-a-half journey followed, with the boat riding huge (to us) seas like a surf-board, and our sheltering from driving rain. A steak "brunch" at midday was most welcome! Friends at Port Fairy had already warned our homes that we might be late—as long as a week—because of high seas and a low "glass". We beat the weather by only a few hours!

It is a report of this expedition, combined with the relatively little published information, that follows.

The Island

Lady Julia Percy Island lies some twelve miles to the west of Port Fairy in Western Victoria; it is about five miles offshore.

The island is roughly arrow-head shape, pointing in a north-easterly direction; it is basically flat-topped, the top varying from 110 to 152 feet above sea-level. It is surrounded by near vertical cliffs which to the average person are scaleable in only two or three places. Elsewhere the cliffs rise abruptly from the sea or from platforms and reefs at sea-level.

As we approached the island, we could see waves breaking against the cliffs, and these appeared to rise up at least fifty feet against the cliff; this was no doubt an optical illusion, but near Thunder Point is a ledge, in which is a pool, some sixty feet above sea-level; this pool is kept filled with fresh sea-water!

From our approach, the island looked like a huge box lying in the ocean, so flat is the top and so straight the walls. From this position, it is hard to imagine the island to be so absolutely alive; for here are thousands of seals, thousands of rabbits, and thousands of sea birds, living around, on and in the island's surface.

Formation Of The Island

The island itself has been formed by some six layers of volcanic lava which vary in thickness from thirty feet down to twelve feet; these six layers are discernible to the geologist and are separated by layers of tuff of varying thickness. Possibly further basalt layers are below sea-level; but the possibility of these has not, to my knowledge, been investigated.

The volcano which threw up these successive layers of lava originated somewhere south of the island, and it is only through the hardness of the layers and their consequent ability to withstand erosion that the island has remained.

The lowest lava-flow has withstood erosion to the greatest extent, for this has formed the reefs and platforms at and just above sea-level. The tuff layers in some places have become deeply eroded, allowing the basalt above to crumble and fall in huge boulders to the lower floors. These slopes of eroded rock, called "Talus fasco", make possible scaling of the cliffs, and the two major points of this collapse are at Seal Bay and Dinghy Cove.

Historical

The island was first named by Lieutenant James Grant of H.M. armed surveying vessel Lady Nelson, on 6th December 1800. Grant sighted the island, and named it in honour of Lady Julia Percy.

When surveyer S. C. Allan wrote of the island in the 1860's, he said it was covered with low, thick scrub, rushes and creepers.

Sealers visited the island, and nearly exterminated the seals in the early part of the nineteenth century, and although there was no permanent settlement, two sealers were buried there in 1822 and 1828 respectively.

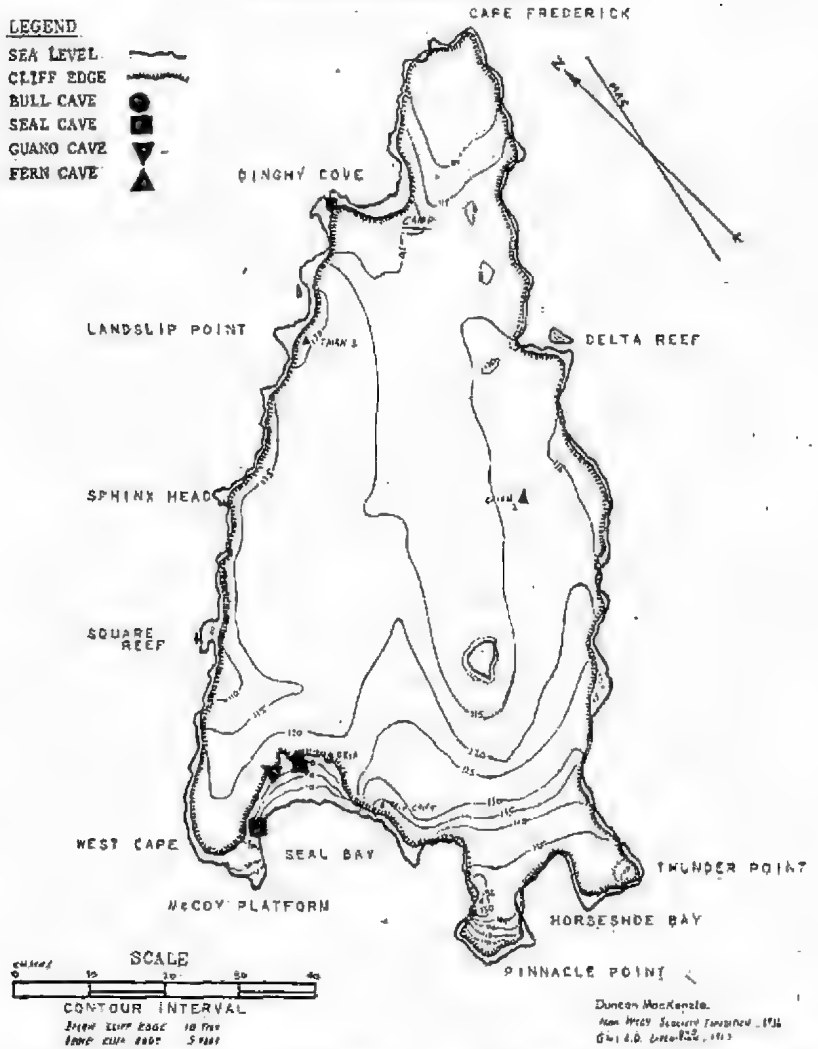
Guano was removed in the 1870's, but it was difficult to obtain and too expensive to ship out. Grazing was attempted between 1879 and 1908, but it was too expensive and the possibility of landing to ship stock was too uncertain. In 1884 pig breeding was tried, but again costs were impracticable, and the pigs were let run wild for several years until eventually Port Fairy fishermen rounded them up and shipped them to Melbourne.

Since these attempts, little has been done to attenipt commercial usage of the island. Sealing, guano removal, grazing—all were eventually unsuccessful. Recently, because of weather uncertainty, attempts to make it a tourist day-trip have failed. Rabbiters are the only ones to succeed financially. Rabbits were introduced in 1868 and flourished; so well, in fact did they thrive that in June 1949, one thousand pair were taken. This is not an isolated onslaught, far more likely an annual event. Myxomatosis caused a great reduction in the late 1950's, but even during our trip we had no trouble in catching, barehanded, ten or twelve in one afternoon. Most of these appeared diseased.

Botany

The McCoy Society investigations showed that the island could be divided into six main plant associations,

LADY JULIA PERCY ISLAND



(1) Fernland (Bracken)—this covers about ninety per cent of the northern half of the island.

(2) Grassland—the eastern and central portions of the island are grassland.

(3) *Senecio* association—a broad strip at the southern end from east to west cliffs.

(4) Swamp—a small swamp exists in a position to the south and east of true centre.

(5) *Mesembryanthemum*—pigface is dense over the two projections of Pinnacle and Thunder Points and inland to about ten chains from Horseshoe Bay.

(6) Celery society—a small area at the east end of Seal Bay.

There are now no plants which could be called even "bushes". This is in contrast to the original vegetation, for in a report in 1862, Surveyor A. C. Allan writes of "low thick scrub". This has disappeared. Apparently at no time were there any trees on the island.

Mr. A. C. Beauglehole in January 1962 prepared a list of the flora of the Island which included eighty-four species—fifty-six natives and twenty-eight alien; the McCoy Society reported only thirty-two, of which twenty-eight were natives and four alien. At the time of the McCoy Expedition, rabbits were at plague proportion, compared with the 1960 expedition when myxomatosis had been prevalent.

Beauglehole recorded such interesting plants as Onion-orchids (*Microtis unifolia*), Buttercups, Bluebells and many others, some unexpected, others obvious.

During our expedition, we made no botanical survey, but it was obvious to us that the three years following the 1960 trip had seen a decline; rabbits were prevalent, and much of the vegetation had been damaged.

However, even with our limited botanical knowledge, we could not miss something which, to us, seemed a complete anomaly— a fern growing on a rocky cliff-face eternally bathed in ocean spray. The plant concerned is the Shore Spleenwort (*Asplenium obtusatum*), and is one of the maritime ferns; its distribution in Victoria is confined to towards Mallacoota in the east, Cape Woolamai (in both these localities it is growing in granite) and comparatively few other localities of lesser importance. At Lady Julia Percy Island it grows in basalt. It also occurs in Tasmania and the Bass Strait Islands.

The plants forming the major associations (listed above) are *Agrostis avenacea* (Blown Grass), *Aira caryophyllea* (Silvery Hair-grass), *Pteridium esculentum* (Bracken), *Senecio lautus* (Variable Groundsel), *Carpobrotus* (*Mesembryanthemum*), *aequilaterale* (Angular Noonflower), *Chenopodium glaucum* (Goosefoot), *Apium australe* (Sea Celery).

Shore Spleenwort (*Asplenium obtusatum*)

Photo: *Trevor Pescott*

Fur Seals

The Island has the largest resident colony of seals in Victoria, larger even than that on the famed Seal Rocks at Phillip Island. As we approached the island, golden brown and blackish forms "melted" from the rocks and, with hardly a ripple, were swallowed by the ocean. The rocks around Dinghy Cove were covered with the somnolent forms which were aroused with the arrival; as they entered the water they became sleek black shapes cutting across our dinghy's bows, or lazing "flotsam" apparently at the mercy of the tide.

As we ferried ashore, the pups scattered from the exposed areas to group in squirming masses in the shelter of the rocks. When we went close to them, they gazed back with huge watery brown eyes, or wrestled with a neighbour in an attempt to retreat as far as possible from the intruder.

One afternoon I spent several hours photographing the adults from a nook amongst the rocks above the main colony. All around me were pups, and a few yards ahead were scores of adults basking in the sun, relaxed, lying over the rough rocks as completely at ease as a man on an air-filled mattress. Suddenly a female appeared just offshore, and barked once. Immediately behind me a pup came to life, and yapped in answer. As the mother called, the youngster clambered over the rocks towards the shore. Eventually I lost sight of both mother, which by this time had landed, and the pup: but I am quite sure that she called her offspring to her to be fed.

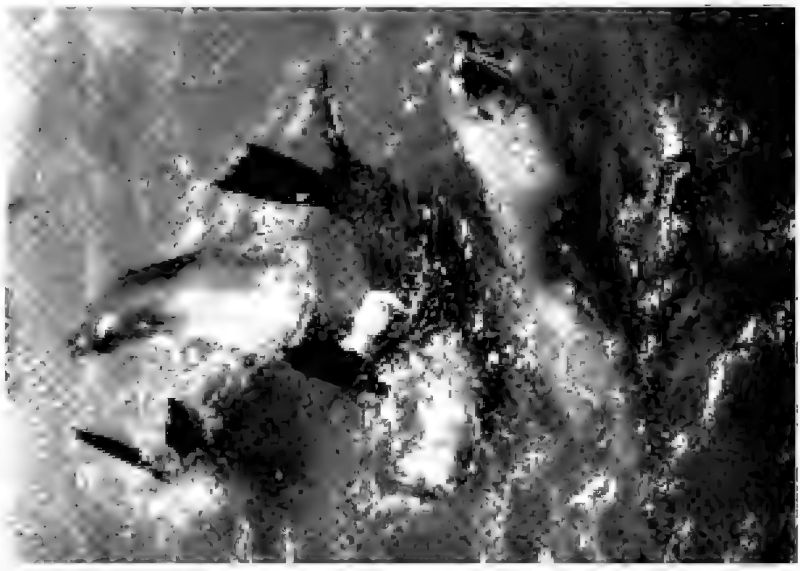
I was impressed, also, by the relatively large size of some young being suckled; while it is claimed that the seals suckle their young for only about three months, it looked very much as though these offspring were yearlings. It is hard to imagine that pups, very small and so obviously dependent on parental care, could be of the same season as youngsters nearly as large as their mothers. All the season's young are born within a few weeks, shortly after the females arrive at the island; this was perhaps four to six weeks before our visit, and it seems unlikely that the two groups of pups, the obvious "month-olds" and the larger ones, could have been born at the same time.

The life history of the Fur Seal in general is understood, the arrival of the bulls, the fights and "beachmaster" claims; the arrival of the pregnant females follows some weeks later, and after they have been collected by the beachmasters into "harems", the young are born. Soon after, the females are mated again, and the embryo remains little more than the united cells for some weeks, or months, before it begins to develop as a foetus. Autumn sees all the seals away from the island for a half-year's roaming of the ocean.

The fur of the seal looks sleek and shiny when the animal lands, but after a few minutes, the fur begins to dry, and assumes a light brown colour; almost invariably, when a seal lands, it scratches itself thoroughly with its claws which are not at the extremity of the flipper but project half-way up. The pups are dark brown even when dry, and this could help them to hide amongst the rocks, for frequently we nearly missed seeing a pup lying still amongst the rocks.

Reptiles

Only one species of reptile is found on the Island, that being White's skink, *Egerna whitei*; however there



are at least three colour variations present. The commonest form is the "typical" *whitei* which is distributed widely throughout the island; the second form is found in a few places and varies from the first only by the distribution of the white stripes on the body. We found the third variation most spectacular, for it had a beautiful copper-coloured tail, far richer in colour than any other of the Southern Victorian skinks that we had seen. It,

too, is very localised on the island and we found it at the head of the cliff above Dinghy Cove.

Birds

Since most of us on our expedition were ornithologists, birds received our main attention. A list of forty-three species has been compiled for Lady Julia Percy Island of which we saw about half. This was due to the fact that many birds are casual visitors and in December would be quite stable at their breeding or summering haunts.

For this report I have generalised on some birds and grouped them as Residents, Seabirds, Irregular Visitors and Introduced Species. Other birds require more specific attention and these species are considered in greater detail.

Little Grassbird

We found a few of these birds present during our visit; the 1948 visit of Mr. Tarr showed that the bird was absent from the island. It seems that this is a late colonising of the island and that the bird has been accidentally introduced probably by virtue of odd individuals being carried there by strong winds; apparently conditions are quite suitable for the bird obviously breeds there.

Residents

Excluding seabirds, hawks and introduced species, there are only about six other resident species.

The Sooty Oystercatcher is one which apparently breeds; we saw several pairs and, during previous trips, young birds have been found.

Others are the White-fronted Chat and the Pipit (Ground Lark), which nests on the top of the island, and the Welcome Swallow which nests in the caves; the fifth is the Little Grassbird.

The other is the Stubble Quail of which we saw several adults as well as smaller, probably juvenile, birds.

Perhaps we should include two others as residents. One is the Bronze Cuckoo which we saw but were not able to identify specifically; no doubt it breeds there. The other is the Eastern Rosella. This last species presented a major problem; Mr. Eric Bound found a dead bird, a juvenile, amongst rocks in a hollow. He is of the opinion that it was a non-flying juvenile which had died in a nest. If the adults did in fact nest there, we have a most unusual and completely unexpected find.

Reef Heron

Reported by the McCoy Society in 1935 as an occasional visitor to the rock pools; it has not been recorded since.

Red-capped Dotterel

An unexpected bird which bred there in late 1934; the McCoy Society recorded a pair with a youngster and specimens were collected. Since there is no beach and no open swamps, it is unlikely that this Dotterel is a resident species.

Fairy Penguin

It has been reported that the Julia Percy colony numbers up to ten thousand pairs and consequently is the largest rookery in Victoria. Certainly the island rookeries are extensive and reach across the talus slopes of Dinghy Cove, over the slopes of Seal Bay and to the top of the island as far from the landing place as a quarter of a mile. There are only three landing places suitable for penguins, Dinghy Cove, Seal Bay and McCoy Platform. At the latter place

Diving Petrel
Pelecanoides urinatrix.

Photo:
Trevor Pescott

the birds have to jump out of the rising swell onto the rocky ledge, for there is no sloping beach. The height of their jump depends on the height of the tide at landing time. We found the birds with eggs and young in the nests.

Short-tailed Shearwater

A very extensive nesting colony exists on the island and thousands of birds are present. Tarr in November 1949 recorded birds circling the island as early as 7.50 and constantly by 8.10 p.m.; our earliest arrival was about 8.10 and constant arrival time nearer 8.30 p.m. Perhaps when Tarr was camped there, the birds arrived earlier because egg-laying had just commenced; at the time of our visit eggs were at least half-incubated.

The historical records do not mention Muttonbirds as a nesting species —could it be that the birds have only recently (comparatively) colonised the Island? The McCoy Society listed them as nesting in large numbers in 1934-'35.

Fairy Prion (*Pachyptila turtur*)

One of our main objects in visiting Lady Julia Percy was to trap and band as many of these delightful little seabirds as possible; our sum result was about two hundred birds. We worked over the talus slopes of Dinghy Cove, where the birds breed, using five mist-nets each about thirty feet long and operating at night between 9.30 p.m. and midnight for two nights. The reason for stopping about midnight was that we began retrapping the same birds at the same spots time and again; obviously the birds had very set routes and after several reconnaissance circuits, they would fly direct to their nests. If a net blocked the way, the bird would be caught on each occasion; we considered that to keep the bird from its nest later than midnight involved unnecessary interference.

The Fairy Prion nests in very few places off the Victorian coastline, and the Lawrence Rocks and Julia Percy rookeries are the most westerly; it has

been suggested that these birds wander westward and many appear in Western Australia. This theory we hoped to prove, or disprove, by banding.

It is interesting to note that on Lawrence Rocks the birds nest in burrows in the ground, just as Muttonbirds do, but on Julia Percy the birds nest amongst fallen boulders at the base of Dinghy Cove and Seal Bay. It has been suggested that the introduction of rabbits to Julia Percy has caused too great competition for the birds to burrow, so they have taken the second best.

Prions nest after the Diving Petrels have reared their young, and lay in late November. Only one egg is laid, this being relatively large, and white. The McCoy Society reported that the birds forsook the island early in February, with the young reaching maturity very shortly beforehand; it would seem, therefore, that the total breeding time involved is about twelve weeks. By comparison the Muttonbird takes about twenty-two weeks from the time that the first birds lay until the rookeries are forsaken for the winter (late November until late in April). This is not to say that individual incubation and fledgling time lasts so long, rather the time from earliest laying to last fledging is this long.

Diving Petrel

One of the most interesting species which breeds on the island is the starling-sized Diving Petrel, one of the smallest of the ocean dwellers. Dumpy in body-shape, blackish above and white below, with a dark beak, it would at first be hard to consider the bird very attractive. Closer examination, however, reveals the quaintly shaped beak, with the nostrils opening on top, the pale blue legs and, when seen at sea, flying into a wave and re-emerging still flying, it immediately arouses our interest.

Some ornithologists hold the view that its smaller wings and dumpy body indicate that it is evolving towards a flightless, penguin-like bird. Perhaps this is true, but nevertheless it is still a powerful and successful flier.

Adult Fairy Prion, *Pachyptila turtur*

Photo: *Trevor Pescott*

We found it nesting in the crumbling cliffs at Dinghy Cove, using as its nesting site the stacks of boulders at the cliff base. Apparently, it had nearly finished nesting in December, for we caught only eight compared with two hundred prions in the same area. The McCoy Society found this to be the case during their summer expedition and Tarr in November also found the breeding season nearly complete.

Some petrels are said to nest in holes like rat-holes above the cliffs, although we missed these, contrasting with the prions which have moved extensively to below the cliffs.

Young petrels have sooty down prior to gaining feathers, and Tarr records their call as a "cricket-like trill.

Other Sea Birds

There are a number of seabirds which are recorded as casual visitors to the island; they are wanderers of the oceans and would land on Julia only in a dire emergency. None of the following are residents on the island and, of course, would not nest there:— Wandering, White-capped, Yellow-nosed and Black-browed Albatross, and Giant and White-headed Petrels.

The Australian Gannet would also fall into this category; it nests at Lawrence Rocks which are relatively close, just offshore from Portland, but it is only a casual "passer-by" at Julia.

The Silver Gull and Crested Tern are sporadic visitors to Julia and roost on the island at night when there has been good feeding offshore; they do not nest there.

The Pacific Gull has been recorded on the island, but is rarely found outside the more sheltered bays.

We recorded the Arctic Skua during our trip in 1963; it was seen flying offshore as we approached the island.

The Erect-crested penguin has also been included in the island list on the basis of a beach-washed specimen.

Irregular Visitors

Lady Julia Percy Island may be a regular stopping place for migratory, and nomadic birds, particularly the Passerines. The Restless Flycatcher is a bird that we associate with timbered areas, so it was with surprise that Tarr recorded the bird there.

The Barn Owl is another unexpected visitor and McKean recorded one bird during the 1960 expedition. Tarr recorded the Blue-winged Parrot and during the 1960 visit, birds of a *Neophema* species were seen; these birds would be visitors which had possibly strayed there in search of suitable feeding grounds.

The Spur-winged Plover and the White-faced Heron are also irregular visitors; it is most unlikely that either would have more than a passing interest in Julia.

Three species of cormorant have been recorded on the island, these being the Black-faced, the Pied and the Little Pied. Although the Black-faced has been found nesting on an island further east, it is most unlikely that any species would nest on Julia.

Introduced Species

Four introduced species have been recorded for the Island and three of them nest there. They are the Skylark which is quite plentiful, the Starling, also plentiful, and the House Sparrow which is quite rare. The Sparrow nests in some of the cliffs including those at Dinghy Cove, but its distribution is very localised on the Island.

The Goldfinch is the fourth species, but this must be considered a sporadic visitor.

In the 1860's, the Guinea-fowl was introduced, but after surviving for at least ten years, it apparently died out.

Peregrine Falcon

This bird is probably a regular nesting species although we saw only one bird. Tarr recorded up to five birds, and McKean listed the bird as having fledglings on the island. This falcon no doubt takes toll of the smaller seabirds, such as prions and Diving Petrels, and it has been suggested that their late arrival time (about 9.30 p.m. each evening) is due to the birds holding back until after dark because of the falcons. Personally, I do not agree, for another small seabird, the Storm-petrel that nests on Mud Island, also arrives at its colony about 9.30 p.m. and falcons are not resident at Mud Island.

Nankeen Kestrel

This bird also nests in the cliffs, and probably feeds largely on the skinks which are quite plentiful. Small birds, larks for example, may also be taken.

We found a very obliging male Kestrel, possibly a juvenile bird, which was quite tame; we could approach to within a few feet quite easily before it would fly. Its favourite perch was rocks on the cliff-tops above Square Reef.

Swamp Hawk

This is a common, resident species, which feeds mainly on rabbits but also on Muttonbirds. We found one nest with well-grown young, and estimated that there were at least eight pairs in attendance. Always, we could see birds drifting over the island and by our experience with rabbits, living must be easy for them.

Whistling Kite (Eagle)

This is a nomadic species which visits the island only occasionally.

Conclusion

Lady Julia Percy Island is a fascinating place, a place where the unexpected can be expected. Too little has been confirmed in print, and it is hoped that this paper will remedy this to a certain extent. Previous expeditions on record are—Early Explorations of various years, the McCoy Society summer camp 1935-1936, Mr. H. E. Tarr's visit in November 1948, various trips by naturalists including camps in November 1960 and December 1961, and lastly the Geelong Wildlife Survey Group expedition in December 1963.

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The Naturalist and the Microscope

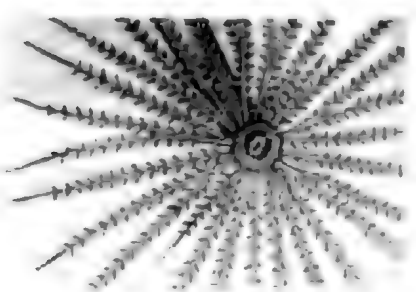
Stratiomys

—By William Genery

Any person who has had the opportunity to see under the low-power microscope the larva of *Stratiomys* or the Soldier Fly, as it is sometimes called, may have been amazed at the extremely beautiful and perfectly designed, symmetrical "coronet" of branched filaments, situated in the tail. This is part of the respiratory system of the larva.

Stratiomys larva can be found in many quiet and shady pools and dams in Victoria, but they are not very well known because few naturalists here study aquatic Diptera, and because of the ability of these organisms to adapt themselves to the colour of their surroundings. They are found in many shades of green, brown and yellow, with varying streaks and spots; the length is about 1½ inches, and they are capable of extending themselves considerably whilst in motion.

The body is elliptical in cross-section, and narrows toward the head whilst the tail is very long and slender. The head is small and horny and behind it are eleven segments, which increase in length after the fourth. Each of the segments overlaps the succeeding one, an arrangement which enables the larva to vary its direction



Respiratory corona on tail of *Stratiomys* larva. Photo: *W. Genery.*

of propulsion. It swims through the water with a looping movement not unlike that of *Chironomus*. When out of the water it can move like a leech using its mouth and the bristles on the tail segments for the extension and retraction of the body; it can also use its mouth and the bristles on the fourth segment for dragging itself along the earth.

The respiratory system consists of a pair of large air-tubes, which extend along the full length of the body and terminate at the large oval spiracle in the centre of the tail coronet. This latter appendage consists of about thirty branched filaments of perfect design and absolute precision; it opens out upon the surface-film of the water forming a little basin open to the air but, on account of the extreme fineness of the filaments, impervious to the water. When alarmed the larva closes up the plumed filaments, so that a bubble of air is imprisoned, and goes down, swimming with its looping movements and carrying a supply of air to last it for a considerable time before it must return to the surface for a fresh supply. The head of the larva is very small, and the mouth consists of two parts, the middle part is black, and pointed, it is separated by several deep grooves from the outer part. In these grooves are the palps which are furnished with thick hairs and convey the food, consisting of microscopic organisms, to the gullet.

The *Stratiomys* larva pupates about mid-summer and, if unable to bury itself in the soft, damp earth, pupation is completed within the larval skin upon the surface of the water. The pupa shrinks considerably until it occupies about half of the envelope of larval skin. Whilst in this state it derives some protection from its enemies for it appears to be a shrunken lifeless mass. It remains in this state for about two weeks before the larval skin splits across the third and fifth segment, and the fly pushes its way out. When the fly first emerges its wings are crumpled up, but they soon unfold and the fly, which is dark and hairy with yellow markings and not unlike a bee, is ready for flight. It has two spines projecting from the thorax and pointing towards the abdomen, hence the name "Soldier Fly" or "Armed Fly". The adult fly frequents flowering plants which grow near water and the eggs are deposited upon the undersides of the leaves of aquatic plants.

NOTICE

Members and Subscribers are asked to note the Hon. Treasurer Mr. A. G. Hooke's change of address to 65 William St., Melbourne, C.1.

A Family of Silver-Eyes

By MARGARET LESTER

Grey-backed Silver-Eye Photo: *Dick Hudson*

When in my small suburban garden one Saturday afternoon (Oct. 24) my attention was drawn to the lemon tree by much squeaking. There I found three baby silver-eyes.

They were 1½" to 2" long with beaks like bits of yellow rubber. Each was a little ball of whitish fluff, except that the wing feathers had developed and made a lovely, olive green contrast to the white fluff. Each also had the merest suggestion of a tail, but not enough to make balancing easy when landing from a short flight. Flight across any open space involved much inspection of the route before starting. The trip from the lemon tree to the pittosporum was done in three stages—about 6ft to the wattle, another 6 ft and down a bit to the fence, then about 8 ft and up a bit to the pittosporum. It was in the pittosporum, when their flying efforts for the day were ended, that they spent the last few hours of the afternoon. Nearby, with a chair, I also spent most of the afternoon, after first searching in vain for a nest.

The parents were working hard the whole afternoon feeding them, the adult placing its beak right inside the mouth of the youngster. Each time a parent arrived much squeaking ensued. Most of the time two of the little ones perched close together so that from the front the pair looked like just one ball of fluff. The third baby was perched a couple of feet away. So far as I could tell, feeding was in rotation. Presumably, "No. 3" was quite sure of being fed but, when one of the adults started preening the other two, he went up and joined them.

I fixed an apple core in the tree and, after about an hour, one of the parents found it. Presumably it was used to feed the youngsters for several direct trips were made to and fro but, after four or five such trips, the bird flew off further afield and only returned for more apple after about an hour. It seemed that change of diet was prescribed.

Since I could not find a nest I determined to stay around until bedtime, thinking that I would then get a clue as to where the nest was. But, to my amazement, the family roosted

in the pittosporum. At first the five of them were closely packed on a little branch, the two adults and then the three babies all in a row. Squeaking stopped and I thought they were settled for the night. But it was chilly and, seemingly, the outside youngster reckoned it was not good enough and flew in between the parents. It was getting dark and I could not see the final outcome of that sortie. Soon there was silence. I decided that they were settled for the night and left with my chair; but, just as I was about to enter the house, much squeaking started up again.

I returned hastily. A baby was fluttering and again it looked as if he were trying to get between the adults, but he lost his balance and fell quite a distance, not recovering until he found a convenient branch a couple of feet from the ground. After a minute of two he set up a great cry until one of the adults came down to him. It was now fairly dark and I lost sight of the two for quite a while. Meantime the other three, two babies and one parent, remained quiet and packed closely together on their roosting spot. At last, by the noise going on, I found the two at a spot some feet away from where the baby one had landed, but not very much higher. Obviously, parent was scolding child and telling him to come up and join the others. But despite the parent's efforts the child would not budge—after all it was still darker now. Parent gave it up as a bad job and there the two cuddled up together.

I stayed for a further five minutes. There was not a sound from either of the groups and it seemed that they had really settled at last. So I left them—two babies and one parent about 8 ft up, and one baby and parent out on a limb about 4 ft lower.

Some Highlights of Wildflower Growing

By A. E. Brooks

Melbourne weather may be much better than popular opinion would have us believe, but in winter it can be bleak and not an ideal time for native plants. Because of this, it was very encouraging in mid-winter to see seven sturdy flowering spikes appearing from a clump of Red-stemmed Green Kangaroo Paw (*Anigozanthos manglesii*), with more to follow.

This could only have happened in sandy country where "Ink" Disease is not so vigorous. In the case of this particular plant, which is now about seven years old and growing in an open position, any diseased leaves are broken off and burned. During the last two summers, the plant did not grow very strongly, but when autumn came it began to grow much more vigorously than ever before. As the first flowering spike came into bloom before the middle of August, and was forty inches high, it seems reasonable to say that a Melbourne winter can sometimes produce flowers equal to the best quality to be found in warmer regions to which the plants are native. This example, which was grown from seed, is now about ten inches across at the base and continues to develop into a larger clump.

Another plant of the same species grew in a drier and less open position for about five years, but it is advisable to plant seeds from time to time if it is desired to grow this plant over a period of a number of years.

While on the subject of Melbourne winters, it was interesting to note that vigorous plants of the Sturt Desert Pea, which were grown last year at Beaumaris High School, continued to flower profusely well into the winter. It is almost superfluous to mention that the Sturt Peas had a northerly aspect, and buildings provided ample protection from cold south-westerlies.

The double-flowered form of the Fairy Waxflower (*Eriostemon verrucosa*) is another garden gem. A plant procured originally from Mr W. Cane of Maffra, and planted with an easterly aspect, has been producing its delightful blooms during long flowering seasons for a number of years.

The Zebra Gum (*Eucalyptus crenulata*) is a much larger plant and full of interest. One disadvantage is that the leaves, like those of other silvery-leaved species of eucalypts, are eaten ravenously by caterpillars. The specimen referred to, now an upright tree about thirty feet high and growing too tall for most gardens, was the only plant which grew from a very small quantity of seed collected by a friend who is an enthusiastic field naturalist.

The name *"crenulata"* arises from the rounded teeth along the leaf-edges, while that of "Zebra" Gum is due to markings often seen on the trunks of these trees. The common name of "Silver Gum" is also used for this species. The most interesting thing about the tree, apart from its ornamental appearance, is that it grows only in a restricted area near Buxton,

in Victoria, while its two closest relations, the Heart-leaved Silver Gum (*E. cordata*) and Kruse's Mallee (*E. kruseana*) grow a great distance away, one in Tasmania and the other in Western Australia.

Not far from the Zebra Gum is a "Red"-flowering Gum (*E. ficifolia*), which is remarkable for the fact that its flowers are almost mauve in colour.

Grass Leaf Hakeas (*Hakea multilineata*) in Melbourne are a long way east of their natural habitat, but this species has often been grown successfully in Melbourne suburbs as well as in other parts of Victoria. There is one variety of this beautiful Hakea which has shorter flowering spikes than usual, but these are produced so freely that a length of a foot or more of a branch may be almost completely covered with blossom, giving the appearance of one long, continuous, flowering spike, a glorious spectacle without any doubt.

One of these Hakeas, which reach the stature of a small tree, was grown from seed. It has flowered profusely each year, but appears to be becoming more tired as the years go by because it shows an increasing tendency to recline closer to the ground. Perhaps, unless nearby plants give it sufficient support, it will eventually lie almost along the ground, as I have sometimes noticed with specimens of the Square-fruited Mallee (*Eucalyptus tetraptera*).

Another small plant of considerable beauty, with its blue-purple tinsel-like petals and contrasting yellow stamens, is the Blue Tinsel Lily (*Calectasia cyanea*), which is also known as the Star of Bethlehem. Mainly because this plant is growing in sandy soil similar to that of its native Grampians and the parts of Western Australia where it also grows, it has continued to thrive over a period of a number of years, and has regularly increased in size by sending up suckers close to the parent plant. This species has always proved difficult to propagate, but recently I dug out several suckers which were not too close to be separated from the parent plant. Those which were of mature growth were not successful, but the new shoots which were then about two inches high are continuing to grow well.

The Thryptomene, formerly known as Pink Scholtzia (*Thryptomene oligandra*), the spectacular red-flowered Large Regelia (*R. grandiflora*) and some species of *Baeckea* are other beautiful plants which are so rare in gardens that a big thrill of achievement awaits the person who grows them.

Other growers could add many more plants to this list, and it must be remembered that there is a very large number of spectacular plants which are just as beautiful as those discussed in this article, or nearly so, and are much easier to grow.

Wildflower Slides—Photoflora '65

Book a date now to see the exhibition slides selected by the judges of "Photoflora '65", the annual competition conducted by the Native Plants Preservation Society.

Over 150 slides will be shown, with commentary, at 8 p.m. as listed below—

Melbourne — 17th, 18th, and 19th March, V.A.Y.C. Hall, Gisborne St., East Melbourne.

Bendigo — 20th March, McGillivray Hall, School of Mines.

Ringwood — 23rd March, Lower Town Hall.

Geelong — 24th March, Y.W.C.A. Hall, Aberdeen St.

Wangaratta — 2nd April, Town Hall (small hall).

Shepparton — 3rd April, Civic Centre Theatrette.

All welcome.

Diuris longifolia, Donkey Diuris

By J. M. and W. H. KING

Diuris longifolia, the Donkey or Wallflower Diuris, is one of the most common of our double-tail orchids and is found throughout Victoria excepting the Mallee.

These orchids are terrestial, growing from an underground tuber and flowering during late spring. The plants are robust and variable in height, some growing up to eighteen inches. The leaves are long and sheath the base of the flowering spike. There are generally from two to five flowers, usually yellow in colour with reddish-brown markings, but occasionally they may be wholly yellow.

Duris longifolia Photo: *J. M. King*

The lower sepals or "tails" are crossed and rather short, whilst the large upper petals are rounded and erect.

Recently we have found this orchid flowering in the Warrandyte area, the Grampians, South Belgrave, the Brisbane Ranges and also on the Mornington Peninsula.

The group of *D. longifolia* in the photograph was taken in the spring immediately following the disastrous fires which ravaged the Warrandyte area in January, 1962. Althougn plentiful in other years, we have not seen this orchid growing in such profusion at any other time.

F.N.C.V. Excursion to Western Australia, August 31 — September 22, 1963

With special reference to botanical impressions and gleanings

By J. H. Willis

Two days to Port Augusta

A few Victorian field naturalists have been privileged to visit Western Australia in connection with camp-outs organized by the R.A.O.U. Others have been there from time to time, on business or for private holidays; but, to most members of the Club, the West has seemed remote and rather inaccessible—a vast unknown third of the continent.

Following successful F.N.C.V. participation in a bus trip to Central Australia during August 1960, the thought arose: "*why* not attempt something even more ambitious ourselves, and reach the Indian Ocean?" Great credit is due to Miss Marie Allender (Excursion Secretary) for making all preliminary arrangements, planning the whole trip in detail, and carrying it through to a highly successful conclusion.

Thus, on 31st August 1963, twenty-six enthusiastic excursionists boarded Mackenzie's bus at Flinders Street to begin an exciting journey of 3600 miles by road and 1750 by rail. Most of them (or us) came from the metropolitan area, but Benalla, the Goulburn Valley and Gippsland Lakes each had a representative. A wise rule was that seat companions should change every day, and occupancy of the front "observation" seat also rotated daily so that each had a turn to watch ahead through the ample windscreen. Ken Mackenzie and Bill Morris were the two kindly drivers of the outfit; to their competency, hard work and cheerfulness is due, in no small degree, the success of the entire venture.

Travelling across the fertile volcanic plains of the Western District, so vividly green in early spring was pleasant but uneventful. From Beaufort, westward to beyond the Grampians, the patches of intermittent bushland were bright with the gold of various wattles, none in heavier or more attractive bloom than *Acacia pycnantha* (Golden Wattle) on auriferous hills around Ararat and Stawell. Lunchtime found us outside Wail Forest nursery for a brief stop. Here and there among the rows of planted Sugar Gum appeared troops of Dwarf Greenhood orchids (*Pterostylis nana*). Another 73 miles, and we were across the border into South Australia where an afternoon tea-break was made in

mallee scrub beside the railway line, somewhere between Keith and Tintinara. This is normally good orchid country, especially for *Thelymitra* species; but it was rather too early in the season, and only a few winter greenhoods were apparent. The chief interest there, however, was a low-growing *Pterostylis* (*P. brachyphyllum*) with wiry stems bearing a profusion of dainty, white, star-like flowers; it occurs in similar country along Grass Flat Road, south of the Little Desert, and is one of Victoria's rarest native plants.

Dusk had fallen as we crossed the Murray, to look for hotel lodgings in Murray Bridge. Most excursionists passed their first night-out in reasonable comfort, and, before breakfast next day, a few enthusiasts enjoyed walking back across the long road bridge to scan the river scenery under idyllic morning light. On the east bank they found some vigorous tangled bushes of the curious dodder-like woodruff, *Asperula gemella*, while above mid-stream, on the bridge's decking, were occasional trailers of the "Dun Pea" (*Pisum sativum*), doubtless originating from seed shed by passing trucks. Along the highway west of the town, many paddocks appeared yellow from infestations of Soursob (*Oxalis pes-caprae*)—much brighter than the familiar sheets of Cape-weed back home.

Soon we were winding up and through the scenic Mount Lofty Ranges, past Nairne, Hahndorf and other quaint villages where late almond blossom still showed among the tender leafage of spring. Then began the descent to Adelaide, sprawling north and south along its narrow coastal plain; but, except for obligatory stops at traffic lights, no other halt was made in the neat and queenly metropolis. We pushed on, passing acres of glass-houses for early tomatoes on the northern outskirts and crossing a number of sluggish watercourses (the Little Para, Gawler and Light) that rejoice under the title of "River" but look more like weedy drains. Everywhere flourished that large prickly pest, the silvery Cardoon or Wild Artichoke (*Cynara cardunculus*) which was to accompany us almost the whole way to Port Augusta.

On the Wild Horse Plain, not far beyond Two Wells township, advantage was taken of an old sand-pit to pull off the road for lunch. The day was balmy and everyone sat in the sun against a clump of old cypress-pines (*Callitris preissii*). Here was a chance for the botanically minded to observe such characteristic shrubs of mallee country as *Gellibrandia linearifolia* (Sheep-bush) and *Myoporum deserti* (Turkey-bush), also the ubiquitous juicy, but attractive, weed *Cryophytum crystallinum* (Ice Plant). The pink brine lake at Snowtown is extensively worked for salt, but not easy to photograph in convincing colours—some of our party made the attempt. Crystal Brook is a familiar name to Australian systematic botanists, for a number of Baron von Mueller's earliest type collections were made here in Oct. 1851. Except for the old gnarled Red Gums lining this dried watercourse, there is hardly a native plant there now; crop-plants and weeds reign supreme.

Near Port Pirie one draws near the southernmost portion of the mighty Flinders Range, but both highway and main rail-track maintain a respectable distance to the west of it, all the way to Port Augusta: how tantalizing it was to behold those purplish rocky declivities and wooded gorge-like openings, without a chance to explore any of them or even to stop for a proper photo! In due course we dis-

embarked at the large and historic Flinders Hotel, Port Augusta, to pass the second night. Someone brought in a fine bunch of Sturt Pea (*Clianthus formosus*), and our energetic photographer-in-chief, Mr. Alan Morrison, rigged up a studio in the lounge room for some good flashlight pictures in colour.

Some of the party, who were astir before breakfast next morning, sauntered down to view the narrow head of Spencer Gulf, where seawater makes its nearest approach to Australia's arid heart. The receding tide had left many little white fishing boats high and dry; against a backdrop of sombre mangroves reflected in tranquil shallows, they made a charming picture, and across the Gulf stretched invitingly the long hilly backbone of Eyre Peninsula.

Eyre Peninsula

Then we were on the move once more, heading south-westerly in the direction of Iron Knob. Much of the landscape was dominated by that doughty and very attractive inland tree, the Western Myall (*Acacia sowdenii*)—a veritable umbrella of soft silvery-green that constantly evoked admiration, and what a sight it must be at flowering prime. The well-spaced royalls, with their flattened crowns, characterize a landscape somewhat reminiscent of the "lion country" in South Africa, where acacias also predominate. Here, however, the ground flora consists not of grasses but of Saltbushes (*Atriplex*) and bluebushes (*Kochia*) which impart a whitish cast to the scene. Other small and frequent trees by the roadside were: Quandong (*Santalum acuminatum*), Cattle-bush (*Heterodendron oleifolium*), Leafless Ballart (*Exocarpos aphyllus*) and Bramble Wattle (*Acacia victoriae*), the last favouring dry watercourses and blossoming profusely in October.

More glimpses of the sea at Whyalla where the ferruginous gravel-beds beside the road were gay with white everlastings, golden flower-discs of *Sida petrophila* and azure blue of *Halgania cyanea*. In this trim modern town some gardens displayed native quandong bushes hung with glowing fruits. Then came exciting stretches of undulating mallee country toward Cowell—ablaze with wildflowers, from the tall crimson bushes of *Hakea multilineata* to the rich purples of lovely *Dampiera* species (*D. rosmarinifolia* and *D. lanceolata*). It was frustrating to be tearing past such beauty at 40-50 miles an hour, and the oft-heard plaint of passengers would be "Oh, we *must* stop here!" We did eventually stop for lunch, in a delightful spot illuminated by the gold of many mallee wattles; and among the smaller ground bushes were: pink wiry *Boronia inornata* (its name a complete libel), blue *Halgania lavandulacea* with varnished leaves, blue-green *Prostanthera microphylla* and scarlet *P. aspalathoides*. Conspicuous too were the glistening rose-winged fruiting clusters of *Kochia eriocladа*.

At last the magnificent harbour of Port Lincoln came into view, guarded by its verdant Boston Island, and we found comfortable accommodation in huts of a sea-side camping reserve at the eastern extremity of the town. There was still sufficient daylight for a ramble along the limestone shore, where dense shrubberies afforded a number of wildflowers not seen in other places—*Templetonia retusa* ("Cocky-tongues"), *Zygophyllum billardieri*, *Lasiopetalum discolor* and *Westringia dampieri*, to name a few.

(To be continued)

Field Naturalists Club of Victoria

General Meeting—February 8, 1965

About 125 Members and friends attended the February General Meeting. The President, Mr. M. K. Houghton, was in the Chair.

The Hon. Secretary, Mr. E. H. Coghill, made a number of announcements, repeating the invitation for two Members attending the ANZAAS 38th Annual Congress in Hobart to be accredited as representatives of the Club and drawing attention to the screening of Photoflora Competition slides (see notice on page 306 of this issue). The President then formally presented to Miss Marie Allender the Certificate of Honorary Membership awarded to her at the December General Meeting. In reply Miss Allender said she was thrilled by, and grateful for, the honour.

The Subject for the Evening was "Trees and Birds" and the speaker, Mr. E. S. Hanks, gave an interesting account of many aspects of Australian natural history which he illustrated with some excellent colour slides and enlivened with a number of humorous anecdotes and quotations from relevant poems. Early exploration along the Victorian coast was described and George Bass was mentioned not only as an explorer, but also as a biologist. He was one of the first to dissect an *Echidna* and to identify a wombat as a marsupial. He studied pelicans and the venoms of snakes and counted the cervical vertebrae of the Black Swan. Mr. Hanks showed slides of various eucalypts, *Pandanus*, Burdekin Plum and Bottle Tree and of many species of birds. Some of the latter were photographed at the nest and others whilst feeding on honey, cheese or other suitable bait, a technique that Mr. Hanks had used with great success.

The President thanked Mr. Hanks for his excellent talk and the audience showed its appreciation by applause.

The new Members listed on page 283 of the February *Naturalist* were elected.

Mr. W. Woollard, referring to Mr. Hanks' mention of the Noisy Miner as a great fighter, described how a cat that had been a very active and agile bird-catcher in Glen Waverley had been routed by the Noisy Miners when its owner had moved to Mt. Eliza.

Mr. P. Kelly showed a colour slide of the heads of two decapitated, juvenile Cape Barren Geese washed up on the beach of Oberon Bay, Wilson's Promontory. The President asked if a duplicate of the slide could be obtained to forward as evidence to the appropriate authority. Several Members mentioned that Mr. Graham Pizzey had drawn the attention of the Bird Observers Club recently to the illegal slaughter of these birds on the Glennies by fishermen.

Mr. Coghill questioned Mrs. Hanks' quotation at the January meeting that the Cape Woolamai excursion, which she had described, was the first "mixed" camp-out by the Club.*

Mr. J. Baines, who had been on the recent Club excursion to Tasmania, mentioned that Gustav Weindorfer, who had been responsible for Cradle Mountain National Park, had been a Member of the Club. He thought it a pity that the Trail-Side Museum, which contained examples of natural history subjects in the Park, contained no botanical material since botany was Weindorfer's main interest.

Exhibits on the table were a box of butterflies, moths, wasps and other insects collected on Mt. Beauty and the Bogong High Plains and brought by Mr. R. Condon and three minerals, Rock Cry from Kingsgate, N.S.W., amethyst from Glen Innes, N.S.W., and epidote from Booloomatta, S.A.

Marine Biology and Entomology Group —November 2, 1964

The meeting was chaired by Mr. R. Condron. There were 13 members present. Apologies were received from Mr. R. Lee, and Mr. and Mrs. M. Houghton.

The speaker for the evening was Mr. R. H. Schurr, Assistant Entomologist of the Burnley Horticultural Gardens, his subject being "Marine Plankton". Mr. Schurr spoke of the work that had been done in this field of Marine Biology at

* The substance of Mr. Coghill's remarks and Mrs. Hanks's reply will be found under "Letters to the Editor" on page 314.—*Editor.*

some length to the great interest of all members of the Group. At the conclusion members asked many questions and Mr. Schurr was thanked by the Chairman of the Group, Mr. Condron, for a very enlightening lecture.

Exhibits: Mr. E. Coghill showed two species of case moths; Mrs. Z. Lee a species of mason wasp; Miss L. White displayed some acacia galls containing larvae of a species of a moth.

Marine Biology and Entomology Group —December 7, 1964

Mr. R. Condron chaired the meeting which was attended by 28 members. An apology was received from Mr. P. Genery.

General Business: It was announced that there would be no meeting in January 1965. Some discussion also took place re the February meeting as it falls on a holiday. It was decided to hold it.

As there was no speaker for the evening, Mr. J. Strong showed some slides of his trip abroad, including several taken at Peter Scott's bird sanctuary at Slimbridge, Gloucestershire, England.

Microscopical Group Meeting—October 20, 1964

Eighteen members and visitors attended this meeting which in the absence of Mr. E. Le Maistre, was chaired by Mr. D. McInnes.

Apologies were received from Messrs. Barratt, Woollard, and Le Maistre.

The group was informed that Mr. Woollard could obtain 3·5 diopter lenses for the M 40 variety of gunsight. These, which cost about 10/-, would increase the power of the previously discussed binocular dissecting microscope (with 10X ocular would give 15X).

Mr. McInnes announced to the group that the microscope books and slides were now in one place in the library.

Mr. D. McInnes gave the group a talk on the theory of microscopical magnification, micrometers and their calibration. He explained and demonstrated to the group how with a piece of ruled celluloid cemented to a slide, a most useful micrometer slide could be improvized, whilst a disc cut out of the same material placed at diaphragm level in the eye-piece produced a most practical micrometer ocular.

With the aid of a number of "Club" microscope tubes and some ingenious pieces of equipment, many of which had been improvized by "Dan" himself and some by other members, he was able to demonstrate exactly what happens at each point along the optical path—from the objective to the Ramsden disc. Also by the projection of the image of one of these rulings on to a screen 250 mm from the Ramsden disc, the true magnification of any lens combination could be obtained.

On display were various Crustaceae; Lepidurus and Conchostracae. Also exhibited was a light-meter made by Mr. Dacy.

Microscopical Group Meeting—November 18, 1964

Eighteen members attended this meeting which was chaired by Mr. E. Le Maistre.

The secretary commented that on reading through the minutes he noted that it was just over 10 years since this group had been formed from the Microscopical Club of Victoria. The chairman then spoke about the printed *Proc. Microscop. Soc. Vict.* and asked members if they would look through their papers and books and see what copies of the *Proceedings* they had. As they contained many invaluable articles, it would be advantageous to bring together all of the separate parts that members had and produce a complete set.

Mr. D. McInnes informed the group that Mr. Hope had had an accident and was seriously ill in hospital. All present expressed their sympathy.

The guest speaker for the evening was Mr. Hugh Wilson of the Department of Works, who gave members a most lucid talk on the "Chemistry and Ecology of the Reservoir of Darwin."

For two years he had investigated various troubles and problems arising as a result of a number of factors causing colouring of the water supply for some 18,000 people in Darwin. The chemistry and bacteriology of this water supply was typical for a tropical climate. Of special interest was the stratification with formation of the curious "thermocline," below 25 feet.

He concluded by listing the various diatoms, desmids and bacteria which he had found there.

The chairman moved, on behalf of those present, a vote of thanks for a most interesting and informative talk.

Marine Biology and Entomology Group —February 1, 1965

The meeting was chaired by Mr. R. Condron; 14 members being present. Apologies were received from Mr. and Mrs. Lee. Minutes of the previous meeting were read and confirmed.

The Secretary announced that Mr. J. H. Barnes of the Forestry Commission would be the guest speaker at the March meeting, his subject being "Quarantine", as affecting the importation of plants, etc. The guest speaker for the April meeting would be Mr. H. R. Schurr of the Burnley Horticultural Gardens. His subject would be "Herring fisheries of the North Sea," in connection with which he would speak on North Sea plankton.

A letter received by the Secretary from Mr. M. Harrison, a member of the Club, who was on a cruise, was read out to the Group, and aroused much interest.

This being a member's night, the following exhibits were shown, and spoken to:—

Mr. D. McInnes displayed microscopically several different species of rotifers, and other microscopic life, which he had obtained from Albert Park Lake.

Mrs. D. McInnes showed a larva of *Chelepteryx collesi*, the White-stemmed Gum-Moth.

Mr. R. Condron showed a case of insects obtained from the Bogong High Plains. These included Alpine Brown butterflies; three different species of cicadas; and several different species of wasps, including ichneumons. Mr. Condron remarked on the large number of wasps seen, and said that this might account for the relative scarcity of butterflies and moths in this area.

ERRATA

In the account of the January General Meeting on page 283 of the February *Naturalist*, Mr. J. Baines was wrongly reported. It was Mr. F. G. A. Barnard and not Mr. C. Barrett who contributed the histories of the Club published in 1905, 1920 and 1930.

BANDED SEA-BIRDS

The following press statement issued by the Fisheries and Wildlife Department, Victoria, is printed for the information of Members:

Summer time is beach time. While Victorians are on the beaches they can help scientific research by looking at any birds found along the beaches.

Many sea birds are being captured, banded and released on mid-Pacific Islands in a widespread study of migration. The Smithsonian Institution, Washington, D.C., has notified the Fisheries and Wildlife Department that 300,000 birds of 28 different kinds have been banded in the Central Pacific with numbered aluminium leg bands. Of these, over 60,000 have been marked with 4-inch coloured plastic leg streamers.

If a bird is found dead, remove the band and send it together with a note giving the date and place of recovery as instructed on the band. For live birds, only the band number together with date and place of capture need be sent to the directed address, after which the bird should be liberated so that its further travel may be traced.

Anyone sighting a bird with a coloured leg streamer anywhere in the Pacific Ocean area is asked to co-operate by recording the name and description of the kind of bird wearing the streamer, the colour of the streamer, the date seen, and the latitude and longitude or approximate location of sighting.

Many birds are being banded in Australia through the C.S.I.R.O. Bird-banding Scheme. These, too, should be reported.

EACH CO-OPERATOR WILL BE ADVISED WHERE THE BANDED OR COLOUR-MARKED BIRD WAS TAGGED.

Reports can be sent to the Fisheries and Wildlife Department, 605 Flinders Street Extension, Melbourne, who are co-operating in this work.

Dear Sir,

Mixed Camp-outs

I must challenge the statement of Mrs. Hanks recorded in the February *Naturalist* on p. 280, that the Woolamai Camp-out thirty-six years ago was "the first mixed camp-out in the Club's history".

Both my mother and my aunt (Dr. Halley) attended the great Buffalo camp-out in 1903.

Mistakes like this tend to be perpetuated and I think this correction should be given some publicity.

Yours sincerely,
E. H. Coghill,
Hon. Secretary.

February 10, 1965

Dear Sir,

A Correction

At the January 1965 "Members' Night —Reminiscences", I dealt with a Club "Camp-out" at Cape Woolamai, and read the following portion of the report by the two leaders, Messrs. L. L. Hodgson, and V. H. Miller, *Victorian Naturalist*, 44 (ii)—

> "This excursion was in the nature of an experiment, as to the desirability of mixed camps, and was an unqualified success, thus amply demonstrating the practicability of 'camp-outs' organized on similar lines."

I assumed from this that the Cape Woolamai camp-out was the *first* on these lines held by the Club, but in this I was mistaken.

Miss Janet Raff remembers being one of several women members of a party which made a naturalist survey of the Vereker Range some years earlier. Mr. E. Coghill also recalled that a similarly constituted Club camp was held on Mt. Buffalo.

Possibly there were others in the early days of the Club.

(Mrs.) I. P. Hanks,
1 Second St.,
Black Rock, S.9
February 11, 1965

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2/6

This excellent picture of a female Mulgara with her 12-weeks-old family was one of a number illustrating an article "Breeding the Mulgara" by David Fleay in the October 1961 *Victorian Naturalist* 78: 167.

Vol. 81, No. 12

F.N.C.V.

April 8, 1965

The Victorian Naturalist

Editor: J. R. Hudson, B.Sc., M.R.C.V.S.

Assistant Editor: R. H. J. McQueen, B.Sc., Dip.Ed.

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Front Cover:

This is another of Alan Owen's photographs of young White Ibis (*Threskiornis molucca*) taken in the ibis rookeries near Leitchville on October 24, 1964.

Twenty-four Hours at Wyperfeld

By G. M. Ward

In the early spring of last year my wife, two small children and myself, decided to include the Mallee region of Victoria in our proposed seven-day trip through the central and western areas of the State. This, of course, also meant that we would try and spend some time at Wyperfeld National Park.

Never having been to the Mallee before, we had only the comments of a few individuals to guide us. I might mention here that if we had paid attention to most of these comments, a most intriguing and memorable part of our trip would not have eventuated. We were told of dust, desolation, and a lack of almost everything. In fact it was with some apprehension that we at last decided in favour of the trip, and also, of spending a night at Wyperfeld, forsaking the comfort of conventional beds and attempting to sleep in our station sedan.

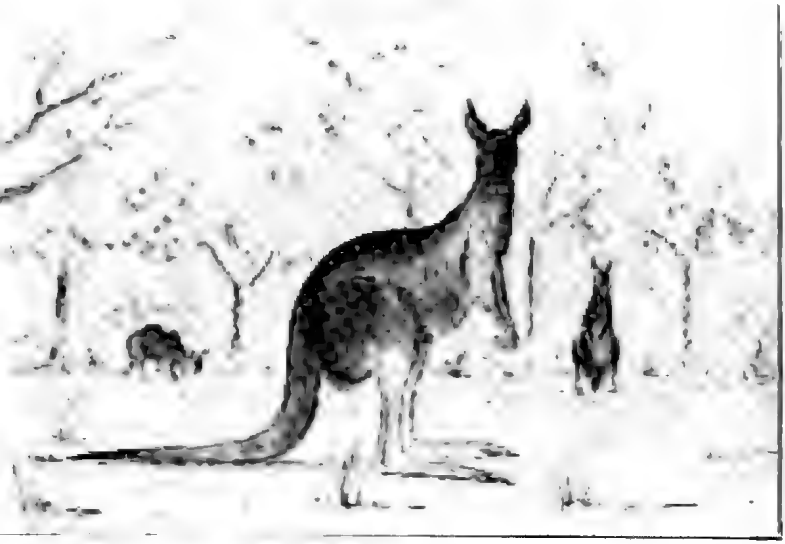
To the hard-bitten camper this may sound nonsense, but to the uninitiated young family with two small unknown quantities (with regard to camping), it could prove to be a problem. However, setting off from Swan Hill with the weather at least on our side, we travelled towards our destination hopefully.

As we drove on, our first impressions of Mallee country-side were most encouraging—no expected dust, no desolation, nor a lack of almost everything; but a pleasantly warm, windless day with gently undulating spring—green pastures, stretching acre upon acre into the far distance to be here and there subdivided by narrow belts of the attractive Mallee type of eucalypt.

It was whilst driving through this type of country with the added peaceful sight of a small pool, dappled with the reflections of a clump of Mallee-trees, that I wondered what it is that makes present-day individuals so discontented and ungrateful. While in the midst of this contemplation I had not noticed that a stumpy-tailed lizard, apparently sharing my feeling of freedom and peacefulness, had waggled itself amiably on to the red earth road into the path of the oncoming car. I saw him in time and swung around him in an arc, stopping a little ahead and walking back to see if he was safe. I need not have bothered, for he still waggled amiably on, not even lifting his head, and oblivious to any road law that he may or may not have infringed.

After this little diversion, our next stop was to be Wyperfeld, which lay about 10 miles away to the north-west. This distance was soon covered and we passed under an archway constructed of logs, the cross beam of which bore an inscription that signified we were now entering the largest National Park in Victoria. This was Wyperfeld! As we drove along the five miles or so to the Camping Area and Wonga Hut, I felt as a small boy might feel when, after having been blindfolded, the handkerchief is quickly removed while he sits alone at a birthday-party table. Where should I start?

Black-faced Mallee Kangaroos bounded to a safe distance from which to stand erect and view our "tres-



G. M. Ward

passing" car disdainfully. Emus ceased feeding, and with heads raised haughtily, watched as we moved slowly past. Galahs flapped from their feeding in the grass to a safer vantage point, showing their pink breast feathers to the late afternoon sun as they wheeled upwards to alight on the stark limbs of a lifeless giant Red-gum. As they settled they voiced their resentment at being disturbed from their evening meal.

These were some of the sights and sounds with which we, as newcomers to the area, were greeted. No doubt, people familiar with the area would have seen much more, but we felt that even if we saw nothing more, our trip so far to this part of Victoria had been very worthwhile and we had found the comments of our "advisors" to be completely false.

With this pleasant five mile prelude to Wyperfeld at an end, we entered the extensive area which has been well chosen and prepared for campers. The shelter offered by the giant River Red-gums and the belts of densely growing Black Box trees is sufficient to enable campers to spread out comfortably. We chose our spot under the canopy of one of the giant Red-gums close to the banks of the dry bed of Lake Brimin.

Mr. Campbell, who has an onerous task as Ranger of the area, was quick to identify us as newcomers and gave us some very sound advice as to the suitability of tracks for vehicular travel. He indicated firmly, though humorously, that notices bearing the words "Sandy Track" were not put up for "birds to perch on". After a short, friendly chat he bade us goodbye and left, he, to carry out his last tasks for the closing day, and we, to carry out our first tasks for the coming night. These were not very many, merely the preparation of cooking apparatus for our evening meal. So, while my wife set about preparing our meal, and the children set about one another, I took the opportunity of watching an act that was being carried on above us in the branches of the Red-gum. Two Mallee Ringneck parrots were chattering away incessantly while following each other

Ringneck Parrots.

Pencil drawing: *G. M. Ward*

around the tree-top. I watched as they pottered about examining the many holes which commonly occur in Redgum limbs, but was unable through inexperience to ascertain whether they were male and female. If this was so, they provided a beautiful example, as they inspected hole after hole, of a young married couple in their state of indecision when looking over prospective homes. One, presumably the male, gave a cursory glance at a particular hole and stood aside as his spouse peered in the hole first from one side, then from the other, turned herself upside down, and finally, still in this position all but disappeared within the hole, only to emerge dissatisfied with the interior decor. The two of them moved to another hole and the performance was repeated, the "spouse" always having the final decision. With dusk finally limiting my vision, and my spouse giving her final decision, I sat down to my evening meal.

With appetites satisfied, we now prepared ourselves for night, and it wasn't long before all four of us were oblivious to the owners of pairs of eyes which, before I settled down, shone red when caught in the sweeping beam of my spotlight. These eyes of course belonged to the many Black-faced Mallee Kangaroos which roam from the seclusion of the Black Box timbers to feed at night on the herbage of the dry lake-beds.

The night was soon past, and early morning found us stirring to the mixed chorus of voices from magpies, Ringneck parrots, and Magpie-larks —certainly an improvement on the tormenting bell of an alarm-clock to which most of us are subjected each morning.

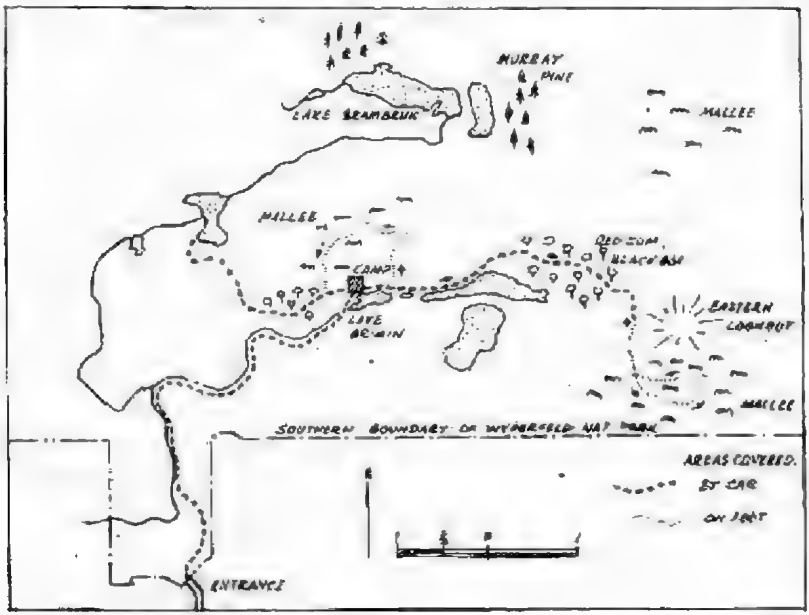
After a quick but satisfying breakfast, we set aside the next eight hours for the seeing of as much of Wyperfeld as we could. This, we knew would not be a great deal, but I felt that we might drive for as far as it was safe, and then I would walk as far as I could alone in the time left. My wife unselfishly suggested this, which meant of course that she had

to entertain the children. With this decided, the track which led past Flagstaff Hill towards Eastern Lookout was chosen, and whilst on this track we saw our first Major Mitchell Cockatoos in their natural habitat. A pair of them was perched high on a limb of a Redgum, and stayed there as I drove slowly underneath. From here I was able with the aid of binoculars, to admire the beautiful soft pink, shaded so delicately into the breast feathers, before they both decided that they had been scrutinised with field glasses for long enough, and that it was now time to leave. So with their typical cry they launched themselves off the limb and flapped away to some less conspicuous perch. With the disappearance of these birds, we drove slowly on until our approach disturbed a mob of twenty kangaroos in an area of Black Box trees. Without hesitation, they bounded with unslackened speed unerringly, between the several tree-trunks, raced across the clearing on either side of the track, and entered the shelter of another area of Black Box.

The grace, rhythm, and harmony of movement of kangaroos when travelling at top speed is something that is missed when we are able to view these animals only behind wire netting or bars.

We travelled only a few hundred yards more before I, recollecting the Ranger's warning, stopped the car in obedience to a sign which read "Sandy Track". Some weeks previously, the failure of a family to observe this warning led to their overnight stranding until rescue arrived next day. We did not aim to repeat this episode.

Leaving my wife and children in charge of the car, I set out from near the foot of Eastern Lookout along a track which would certainly have tested the efficiency of any four-wheel drive vehicle. As I walked on up the sandy incline, I began to feel both insignificant and inadequate. Insignificant because of the vastness of the landscape which lay before me, and



inadequate because of my inability ever to appreciate and know fully the flora and fauna of the area. All I was able to do was to wander through and marvel at my immediate surroundings. Passing from some mallee thicket into a grassed, sandy clearing, I became interested in a particular clump of grass. A small bird was flitting into and around about it obviously enjoying its meal of insects, which it kept disturbing from within the grass.

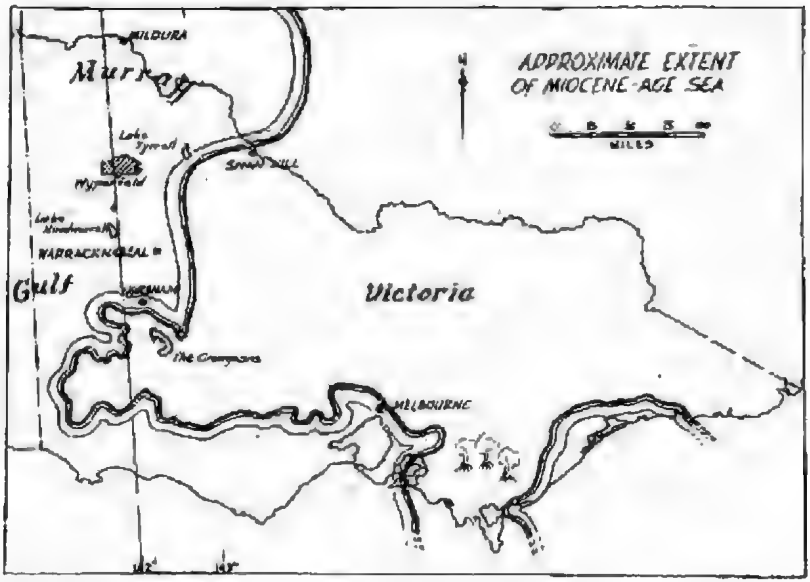
As I approached, the bird of course retreated a little further away, and after having convinced myself that this little sprite was the Grass Wren, I felt that I might identify the plant as well. I say "felt" advisedly, for this is exactly how I did identify it. It wasn't just a small grass tussock, it was a cushion some twelve inches in height, and five feet in diameter, composed of the most viciously pointed spines I have ever contacted. They seem to have the ability of inflicting pain before contact is made with them. After closer examination of a single spine I was able to understand why, for, the last quarter of an inch or so is extraordinarily fine, so fine in fact as to be almost invisible. Of course this plant was undoubtedly porcupine grass, and how the little Grass Wren is able to flit in and out with complete immunity, I shall never know, but here is just another facet to Wyperfeld's fascination.

I wandered from here, up the gentle slopes of Eastern Lookout, through more Mallee thickets, hearing as I went, the voices of many different birds but very rarely being able to see the owners, or at best, catching only a fleeting glimpse of one or two as they disappeared quickly among the interlacing branches and foliage. Some of these birds, such as the Willy Wagtail, Wattle Bird and Raven (or Crow) I could identify through familiarity of call owing to their great range of distribution. Others, of which I caught a glimpse and felt fairly certain of their identity were the striped Grass Wren, Scrub Robin, White-browed Babblers and Quail Thrush. But those which I knew, were in the minority; by far the greater number were to me, unknown and usually unseen, and I realised as I reached the summit of Eastern Lookout, just what a vast number of species of birds alone, live in this area.

While I sat, reflecting and gazing over the undulating landscape, the thought crossed my mind of the geological changes which had taken place in this corner of Victoria. I wondered whether its fascination for me would have been greater or less, had I been sitting there in Miocene times when a great sea extended far into and over this particular area. I decided without much hesitation that the greater attraction for me was the present; with vulcanicity, faulting, sagging and warping of the earth's surface still not quite over, in early Miocene times, enjoyment of such a trip might not have been quite so great.

My reflections on this topic were quickly lost after a glance at my watch. Already four of the precious eight hours had gone.

After two hours, my wife would very likely have exhausted all forms of entertainment for the children; so reluctantly I made my way back in the direction of the car. With a few hundred yards to go, two small figures appeared from around a bend in the track. Hand in hand like Hansel and Gretel, my two children had apparently decided, and quite validly too, that if their father could wander off and enjoy this "Wonderland", then so could they. We met and made our way back along the track, and as we did so, Peter pointed to some foot-



prints in the sand just ahead of us. I anticipated his question which followed almost immediately—"What made those marks?" I was thankful that it was a question which I felt capable of answering. There were two sets of tracks each different. One, looking like large arrow heads placed one after the other, was made by the three forward-pointing toes of the feet of an emu and the other consisted of two narrow impressions side by side and parallel with each other, with a scattering of sand at one end of each impression. This second set, we decided, was made by a kangaroo bounding across the track. Feeling very pleased with themselves for having found these tracks, the two ran quickly back to the car to tell of their discovery.

Once more back in the car, we drove slowly along the track by which we had come. At intervals in the Black Box forest small flocks of Regent Parrots flashed between the tree trunks, while Eastern Rosellas, using their irregular wing-beat to give them that peculiar progressive catenary-like flight, made their way from one Red Gum to another. Out of the timbered area now and travelling along the margins of the dry lake-beds, we found ourselves watching half a dozen emu chicks being taken for their midday walk by their parents. It was difficult to understand how, with such tiny legs, they managed to keep up when the adults broke into their long loping stride, but they did so with little trouble, and soon the grass hid from view their dark grey and white striped bodies.

We returned to Wonga Hut, had lunch and packed the car ready for our mid-afternoon departure. But before this "dreadful" time arrived, we still had a few hours left to us. So with my wife and children content to stay at the camping area and enjoy the warm spring-afternoon sunshine, I decided to walk, this time along the track leading past Flagstaff Hill and Mount Mattingley which eventually

reaches Lake Brambruk. Unfortunately, I was unable to travel this far, but even so, the couple of hours at my disposal were full of interest.

I had only gone a short distance into a section of Black Box forest, when I passed a particular tree with a section of dead branch which looked a little oddly placed with respect to the adjoining limb. A closer inspection showed that the pattern in the markings of the bark on the dead section was different from other parts; and an even closer look indicated that I was looking, by sheer good fortune, at a Tawny Frogmouth which at this stage, had not apparently been sufficiently aroused as to open its eyes. These remained as narrow slits to complete the almost perfect simulation of a dead, broken limb.

I retreated as quietly as I could and continued on through the forest, to leave it eventually for the sand-dune country of Flagstaff Hill area. But whilst still among the trees I had become familiar with the sharp piercing call of a bird which skimmed from one tree to another, alighting at a lower position on the selected trunk than that, which it had immediately left, and then proceeding spirally upwards. These points indicated that this bird was a tree-creeper, and from its general colour I assumed it to be the Brown Tree-creeper.

As I mentioned, I was now out of the Black Box forest and walking amidst the vegetation of the sand-dune country near Flagstaff Hill. The variety of this vegetation was surprising. Dumosa Mallee appeared here and there on the dunes, whilst other parts were covered by Green Tea-tree. In small clear patches there grew the Fringed Heath-myrtle, the Twiggy Guinea-flower and what I took to be the Ice-plant, a species of *Mesembryanthemum*. The foliage of this plant glistened in the sun as though crystals of ice from the freezing tray of a refrigerator had been scattered over it.

On the dune ridges to the north-east, and overlooking all this, grew tall specimens of Cypress Pine.

I moved on towards clumps of Green Tea-tree which, unknown to me, concealed a host of feeding Mallee Ringneck Parrots. I was made well aware of this fact by the frenzied flapping of dozens of pairs of wings and the leaping into life of the foliage which surrounded me. I might say that my surprise was as great, if not greater than that of the parrots. On recovering from the suddenness of this mass exodus of birds, I made my way out of the tea-tree into a more open region and was in time to see a bird hurrying over the sand bordering the tea-tree. The sides and crown of its head had, at first, the appearance of a North American Indian princess; her dark hair tied in place with a white forehead band. I followed as quickly as I could without undue noise, and was able to observe the bird through binoculars well enough to establish that it was a Banded Plover—a most attractive looking bird with its white throat and "headache band", and a blood-red area at the base of its upper-bill. I proved less adept at covering the ground than the bird which was soon out of sight, leaving me to wander on across the dunes to the west, with here and there patches of vegetation such as Storks-bill, Golden Pennants and other herbaceous plants, all helping in some small way to stave off wind erosion of the dunes. It was strange that in a patch of vegetation, I came across one of the two insects to which I could devote any time. Why it should be one of the most wonderfully camouflaged species that attracted my

attention I cannot tell, but there it was, motionless, on a small dead twig at my feet. I made a quick sketch of its shape and size with a note of the general colour, but the finger-like antennae held together straight out in front indicated that it was a species of long-nosed locust. On consulting my copy of McKeown's *Australian Insects* it seems fairly certain that it was the "Blue-winged Locust".

Time again was my enemy, so I plodded across the sandy floor between dunes, with derision being heaped upon me by a couple of crows which "carked" from a limb high up in a dead tree. Their mockery was apt, for here I was, almost at the end of a trip on which I had hoped to do so much, yet had accomplished so little. Such is the nature of Wyperfeld—the more one looks, the more one sees.

I scrambled down the steep slope of a sand-dune and walked through more Black Box forest to the track across Black Flat. It was here that the second insect crossed my path, this time one of our native cockroaches of which there are some three hundred species. This is a surprising figure to most people, owing I suppose to the fact that the native species have remained in the bush, whereas the introduced types have drawn attention to themselves by running foul of man in his home. The particular species I met was about 40 mm long and 25 mm across the body—about the size of a large kitchen teaspoon. The body was of a dark, glossy treacle-colour and considerably flattened, no doubt permitting its mode of life beneath loose sheets of bark. Finally I left it to its own devices and walked the last few hundred yards to my waiting family.

Now, twenty-four hours after our arrival at Wyperfeld, we were ready to leave. This in itself was a disappointment; but on the other hand, like the laden birthday party table, there was much left untouched, and this gave the promise of a return visit, which meant anything but disappointment. One of the untouched things and possibly the greatest was the remarkable Lowan or Mallee Fowl. For weeks I had conjured up visions of studying this bird myself, photographing it, and perhaps watching a pair at their mound; but it was not to be, for through lack of both time and experience I failed. However, I sincerely hope that it remains in its numbers, or even increases, so that my hope for this visit becomes a reality for our next.

So it was, with these last thoughts, that we began the journey from Wonga Hut along the five miles of track which this time, would lead to our exit from Wyperfeld. Indeed, an exit from a place where time can cease to be a rigid controlling factor in one's life; where landscape, animals, and visitor can mingle with none playing a greater part than the other, yet the first two being wholly dependent on the third for their perpetuation. We hope, therefore, that future generations and governments realize this dependence and act in a positive manner, not only at Wyperfeld, but throughout our National Parks generally.

We passed under the cross-beam of the entrance gate and on to the road beyond, being farewelled as we went, by a pair of Crested Pigeons perched at attention side by side on the overhanging limb of a tree, which quickly disappeared from view amidst the swirling dust that lay behind us.

Note: Botanical names and scientific names do not appear in the text. There are, I feel, two good reasons for this, the first being my incompetence at identification, and the second that I feel it is unnecessary to use these names when pure pleasure and relaxation are the main aims of such a trip.

Bush Brushes

The fox's brush was the traditional trophy of the chase. The Field Naturalist usually returns from an excursion into the bush with a different sort of "tale". If you have one worth mounting and preserving send it to the Assistant Editor, "Victorian Naturalist", 262 Nepean Street, Greensborough.

Editor's Note

Many members contributing to these columns during the past six months will be wondering whether their letters have gone astray or if they have been discarded.

Neither is the case. Immediately following our request in the September 1964 issue, a flood of mail was received and consequently we are still catching up with material that arrived during the latter months of last year. But, material is again becoming short. —R.H.J.McQ.

Banded Stilts

The following observations are drawn from a regular contributor to these columns, Mr. H. R. Hobson of Rosebery.

On October 2 last year, when returning home from a trip along the southern coastline we called in to inspect the Lakes at Douglas. Here there was a flock of approximately 500 Banded Stilts and an almost equal number of Red-necked Avocets.

On October 26-27, I again visited the lakes in the hope of making a more detailed study of the stilts. At this time I estimated their numbers in excess of 2000 birds. The stilts were rather wary at first, but later would permit a cautious approach to about 50 yards distance before taking flight. The aerial display was one that will long be remembered.

Several birds were seen to have leg injuries, one in particular appearing to be minus both, with only the left stub visible. This bird would continue to fly for perhaps ten minutes after the flock had settled and would then land on the water.

The evening and night of October 26 was spent beside the Glenelg River near Harrow, where four Winking or Barking Owls were seen and heard at intervals throughout the night.

Wattle Lomandra in Miniature

The following notes and a specimen of the most unusual plant concerned were forwarded by Miss W. Waddell, secretary of the Native Plants Preservation Society of Victoria. In a covering letter, Miss Waddell says " . . . . it was a complete surprise to find something [locally] which I had never seen before." From the specimen one would never connect it with the familiar form, without highly detailed examination.

Have you ever seen *Lomandra filiformis* with leaves that are really filiform?

The Victorian Railways have permitted the formation of flower sanctuaries within railway enclosures and these are not burnt if they present no fire risk.

Much of the value of the Heathmont sanctuary depends on small woody plants such as Karralla which would be ruined by fire, so active members of the N.P.P.S. spent an afternoon getting the sanctuary and its neighbourhood into a satisfactory condition.

It was only when we were leaving the site of the last fire that the little plants were noticed. In spite of the dark-green, thread-like leaves and a flower spike about two inches long, they looked just like miniature *L. filiformis*, and that is what they turned out to be.

Familiarity with the tufts of flat leaves, up to a foot long, of the common survivor led me to a useless study of the other related species. A specimen was finally sent to the Herbarium where it

was finally identified. Apparently the original type-specimen had narrow leaves.

It would be interesting to know where else the miniature form occurs. The plants described are outside the Heathmont end of the sanctuary and are growing beside good clumps of the larger familiar Wattle Lomandras

Genetic Variation of Manna Gums

This highly interesting observation was contributed by Mr A. Stirling of Cheltenham.

This story starts in the bush, but has a suburban ending, with a result that a geneticist could have most likely forecast.

On March 24, 1962, in the Coranderrk bushland which adjoins the Sir Colin MacKenzie sanctuary, a seedling Manna Gum, *Eucalyptus viminalis*, was collected from the enormous numbers of these plants that had germinated after the bush fires which burned this particular part of the country earlier that summer. After being established in a pot for some time it was planted in our garden at Cheltenham in the spring of 1962.

The interesting thing here is that this creek-side tree of the hill country was planted in soil which excavations have shown to be for at least 13 ft. down, pure yellow or white sand, with only the top nine inches or so containing any humus. Further, the seedling was planted within twenty feet of the local coastal variety of *E. viminalis* which in this district grows in a spreading, rather gnarled form, often with a double trunk. The object of this planting was to see whether the seedling from a straight, two hundred foot high parent would adopt the spreading local style of the species because of the deep sandy soil.

"When in Rome do as the Romans do" is no maxim of the Manna Gum. From the beginning it grew with a single straight stem and now (November 3, 1964) it is a sturdy tree, of three inches diameter at the base and seventeen foot high.

How much longer the experiment continues depends on when our nerve cracks. The thought of a two to three hundred foot high tree in a suburban backyard is somewhat daunting!

This article points up one of the most remarkable features of all living things.

This is their ability to adapt themselves to suit particular conditions. Such adaptation is made possible by the wide variation of characteristics which results from sexual reproduction.

The variation leads to the adaptation of individuals of each species so that some may be better suited for living in a slightly different habitat. When these habitats are sufficiently divergent, new species can result.

If the Corranderrk trees are to survive in forest conditions, they must grow tall in order to reach sufficient light for photosynthesis. On the other hand, amongst the scrubby coastal vegetation, such tallness is not of any advantage—rather, it may be disadvantageous in conditions of strong squally winds. Thus, there is a "natural selection" of tall trees in forested areas because they are better able to compete for their requirement of light—any trees not bearing genes conferring tallness fail in such competition and will gradually be eliminated. Thus a tall straight variety or race may be produced and eventually will breed true for tallness. In coastal forms, the converse applies. Here, the short stunted-growth form is probably an advantage and eventually another pure-breeding variety becomes established.

Thus, each race or variety of the one species is adapted to its own particular environment, and if interbreeding between the races is prevented in some way, then two distinct species may develop from the one parental type.

This is the principle underlying the discovery made by Charles Darwin and which forms the basis for contemporary thinking about the process of evolution.—R.H.J.McQ.

F.N.C.V. Excursion to Western Australia, August 31 – September 22, 1963

With special reference to botanical impressions and gleanings

By J. H. Willis

(*Continued from page 310*)

The southern neck of Eyre Peninsula (between Port Lincoln and Coffin Bay on the west) is pleasantly undulating and well watered. Here we saw the widely planted Sugar Gum (*Eucalyptus cladocalyx*) growing naturally, but almost failed to recognize it—instead of the usual tall straight boles, these indigenous trees were as spreading and low-branched as Red Gums on the plains near Melbourne. Soon the impressive Marble Range loomed up in the right-hand distance, and a short stop at a convenient high point on the coast road enabled photographic enthusiasts to deal with a good prospect of the Range. Next came the ten-mile long stretch of Lake Hamilton—narrow, exposed, saline and not very attractive, except as a resort for water-birds. We halted abreast the southern end of the lake and walked across a scrubby limestone ridge separating it from the sea. Our chief objective was a famous osprey's nest that crowns a detached rock-stack.

Here one suddenly beholds a superb line of yellowish beetling ocean cliffs, similar in many ways to the Victorian coastline between Port Campbell and Warrnambool. The windswept ridge-top is almost bare of soil and carries a few species of hardy perennials, individual plants being very widely spaced and all adopting a cushion-like habit of growth. Thus, low dense clear-cut clumps of *Triodia*, *Spyridium*, *Westringia* and *Scaevola* appear indistinguishable from any distance. One enormous and obviously very old hummock of Nitre Bush (*Nitraria schoberi*) must have been ten feet high and wide—it was much photographed. The lower lee slopes near the roadway are quite dominated by waist-high thickets of *Lasiopetalum discolor*; its rather large pallid-lilac flowers deflex toward the ground, exposing to view only the fuzzy reverse side of dull rust-brown. Among these bushes we found a young active Shingle-back or Stumpy-tail Lizard (*Trachysaurus rugosus*).

The noon-time meal on this fourth day out (Sept. 3rd) was taken at a delightful patch of roadside mallee in the Venus Bay area, about 8 miles N.W. of Port Kenny. A small trim cypress-pine to 10 ft. high (*Callitris morrisonii*) intermingled with *Eucalyptus oleosa*, *E. incrassata* and other mallee eucalypts on this lateritic rise. Beneath the canopy of dwarf trees were flowering undershrubs of infinite variety—scarlet of an endemic mint-bush (*Prostanthera calycina*), correa (*C. pulchella*) and grevillea (*G. pauciflora*); gold of *Cassia eremophila*, *Acacia spinescens* and other wattles; blue of *Halgania cyanea* and *Dampiera* species; mauve *Baeckea crassi-*

folia; pink-and-white *Phebalium pungens*, *Calytrix tetragona*, *Lasiopetalum behrii*, etc. Robust bushes of *Templetonia retusa* glowed with masses of large red pea-flowers, while several showy orchids were prolific, notably *Thelymitra aristata* (blue and pink forms), *Caladenia dilatata*, *C. filamentosa* ("daddy long-legs") and *Diuris maculata*—all widespread species in Victoria. Many exposures of colour film were made at this fruitful spot by the wildflower photographers of the party.

En route for Streaky Bay, we noted miles of limestone fences bordering the roadside and dividing pastoral properties. This stonework was often artistic and seemed as much a part of the landscape as do the basaltic fences on Victoria's western plains. There were ruins, too, of little isolated limestone cottages—mute evidence, perhaps, of an unequal struggle between brave selectors and a hard, capricious land. But we were viewing this arid portion of Eyre Peninsula in one of the best seasons ever; after ample autumn rains, green acres of waving grass were now to be seen in all directions. Here, too, occasional big flowers of the Lilac Hibiscus (*H. huegelii*) evoked expressions of delight.

That evening, Ceduna camping reserve found us erecting tents for the first time: the general impression on local inhabitants of a weird assortment of multicoloured canvas prisms, wigwams, igloos, beehives, and even inelegant lean-tos, must have been quite astonishing. Except for tiny Penong (45 miles to the west), Ceduna was to be our last township before Norseman, 766 miles away. Consequently, most personnel took the opportunity to stock up with fresh bread, meat, fruit and other comestibles. A popular butcher retailed prime lamb chops at 4½d. each—can they be as cheap anywhere else in Australia? Some enthusiasts were astir early next morning and found time for half-an-hour's beachcombing. Both pied and sooty oyster-catchers were noted among sea birds; the introduced snail (*Euparypha pisana*) was extremely abundant, their bleached shells decking coastal vegetation like so many snowberries. Very few sea-shells were evident, but drifts of brown algae (*Scaberia*, etc.) lined the beach, and on sand hummocks above the tidal influence there flourished many succulent plants of the mauve-flowered Sea Rocket (*Cakile maritima*). Just as the last tents were coming down, after breakfast, a sudden squall of rain drenched our camp; a wild scatter for shelter ensued, and re-loading of the bus was made more difficult than usual. So we took our leave of Ceduna and were not to walk on another beach until reaching Esperance in four days' time.

Fringes of the Nullarbor

Toward Penong the main feature of interest from bus windows became the bird-life, chiefly members of the parrot order (*Psittaciformes*) of which Port Lincoln parrot, corella, galah and Major Mitchell cockatoo were conspicuous. Near Colona we entered the Yalata aboriginal reserve, where no form of camping is permitted. It is a pleasing countryside: mallee woodlands of tall *Eucalyptus oleosa* alternating with open tracts of saltbush and grass. For mile after mile through the mallee formation, the prevailing colour is silvery-grey, imparted by innumerable hoary bushes of Cone Daisy (*Crutsylis conocephala*). This shrub forms trim cushions 2-4 ft. high and simulates in a remarkable manner the habit of a typical bluebush (*Kochia* species).

During lunch-break, just beyond the Reserve, one of our party ran back to the bus breathless with excitement: out in the scrub she had found a natives' camping spot, apparently vacated only a few hours previously. Those who followed her guidance were rewarded by seeing a row of four neat heaps of flattened grass where human bodies had lain, each separated from the other by the remains of a wood fire. The intriguing scene was quickly perpetuated on colour film.

About 40 miles farther on, we passed the mail-box of Nullarbor Homestead and came to that short, completely treeless stretch of Eyre Highway—the only part of the roadway that crosses a typical section of the vast Nullarbor Plain. Here, too, mounds of freshly turned yellow earth among the sparse bluebush and saltbush gave evidence of the desert-loving and chiefly nocturnal Hairy-nosed Wombat (*Lasiorhinus latifrons*). A halt was called so that excursionists could inspect one of these wombat colonies at close quarters, and amazement was expressed at the quantity of earth excavated by the bulky marsupials; their tunnels seem to be far deeper and more tortuous than those of the familiar *Vombatus hirsutus* in Victoria. Excitement rose high when a wombat suddenly dashed from one hole to another, almost under the feet of a lady observer!

Next stop Koonalda Homestead, among its pretty mushroom-like myalls, and a special detour 3½ miles northward across the plain to see the great 150-foot-wide sinkhole leading down into Koonalda limestone cave. By now the sun was low in the western sky, illuminating the undercut eastern scarp of this very impressive "donga" and affording ideal conditions for photography. For many years the Gurney family has pumped water from a subterranean lake beneath the subsidence, and how we wished there had been time to go down and view the wonders of the big cavern itself. Dark green herbage on the shaded sides and floor of Koonalda sink-hole proved to be a lush growth of Black Nightshade (*Solanum nigrum*), flourishing under the microclimate thus provided.

Another 26 miles west, and the welcome No. 3 Tanks loomed out of growing dusk—our second *al fresco* camp, with tents pitched by torchlight. The solid limestone surface of the plain hereabouts offered considerable resistance to any but the stoutest tent-pegs, and, after futile attempts at penetration, some campers tied their straining ropes to boulders of rock instead. Others were too tired to struggle with a tent at all, simply curling up under the sparse protection of a stunted Umbrella Wattle (*Acacia oswaldii*); for this had been a long full day. Warm as the Nullarbor might be during sunlight hours, it can be cold enough in the heavy dew before dawn, as we were to find out early next morning. However, breakfast around a cheerful camp-fire did much to thaw out one's torpor and, packing up completed, some folk used the time necessary for re-loading the bus to make a brief survey of their surroundings. An attractive feature to the south and west was a large community of Old-man Saltbush (*Atriplex nummularia*), widely spaced compact bushes to 5 ft. high; while everywhere various lichens produced colourful mosaics on the limestone nodules and shallow grey-brown earth.

The first stop on September 5th was to view a small blowhole by the roadside, at 12 miles from No. 3 Tanks. Handkerchiefs and scarves held across the orifice ballooned upwards, in demonstration that air was being forced out of the fissure. At other

times there is reputed to be a down-draught whereby light objects are quickly sucked underground. Then, at last, came the Western Australian border—52 miles beyond Koonalda, and 452 miles from Perth by the shortest route. We were soon at the Gurneys' road house above Eucla Pass, whence unfolds a panorama of the Great Australian Bight 4 miles distant. Here the Eyre Highway descends rather steeply to the salty flats around old Eucla telegraph station, now in ruins and much of it buried beneath mobile sand-dunes. It is hard to believe that for half a century (until 1929) this was a populous and important centre of activity midway between Adelaide and Perth.

The dusty 115-mile stretch of coastal plain between Eucla and Madura is marked "open scrub" on the Shell Road Map, and it proved to be the least interesting region so far traversed. But a few Western Myalls showed their golden blossom, and other floral compensation at the lunching place (somewhere abreast of Mundrabilla on the contiguous Hampton Scarp to our north) were: *Myoporum deserti* (Turkey Bush) with small, white, deflexed blooms like tiny snowdrops, *Nicotiana goodspeedii* (one of the smallest-flowered native tobaccos), fringed yellow heads of *Podolepis rugata* and, most charming of all, dense little bushes of *Eremophila weldii* dotted with azure flower-bells.

Madura is an unimposing huddle of drab whitish buildings. While refueling was in progress there, some resorted to the welcome bar and a few essayed to climb the steepish limestone cliffs of Hampton Scarp immediately behind the settlement. The latter were rewarded with some very good photographs and a spate of botanical treasures, viz: the curious *Melaleuca quadrifaria*, tall aromatic and rosy-flowered *Eremophila alternifolia*, *Olearia muelleri*, *O. exiguifolia*, *Pomaderris forrestiana*, *Rhagodia preissii*, spidery *Stenopetalum robustum* and a crevice fern, *Pleurosorus rutifolius*. The really exciting "find", however, was one old sprawling and prickly bush of the calciphilous heath *Acrotriche patula*—a new record for Western Australia!

At Madura the Eyre Highway once more ascends Hampton Scarp to the Nullarbor uplands 200 ft. or more above, and this cliffy section of the road has been sealed. The escarpment or "range" (about 150 miles long) is really an inland continuation of the cliffs along the Great Bight, and doubtless it marks a former shoreline before slight uplifts occurred in recent geological time. Throughout the 58 miles to Cocklebiddy vast crops of waving speargrass (*Stipa* species) and wallaby-grass (*Danthonia* spp.) dominated the countryside, which is normally bare except for scattered saltbush. One stop was made to inspect vivid splashes of magenta and sulphur-yellow that appeared every now and then amongst the ubiquitous grasses. These colourful plants were found to be *Swainsona microphylla* (a trailing pea) and *Velleia paradoxa* of pansy-like aspect, both of them also native in Victoria.

Cocklebiddy's very recent motel was able to accommodate our entire party; it was a relief to have evening dinner and breakfast provided, after two nights of camping out. At the latter meal we were astonished when a couple of horses strolled through the open doorway, evidently interested in tidbits from the table. John Eyre Motel, another new roadhouse 50 miles farther west, gave opportunity for some wayside exploration while the bus "topped off" with petrol. Here

grew many attractive flowers—blue *Comesperma volubile*, *Halgania lavandulacea* and *Eremophila scoparia*, golden *Podolepis* and wattles, scarlet *Templetonia retusa*, to name a few.

We had entered that section of the highway which runs perfectly straight for a distance of 96 miles, at the end of which is a fence and then within 5 miles the old telegraph station of Balladonia. Droughts being long and frequent in this region, the calcareous road-surface easily erodes. Heavy transports may gouge out trenches that fill up with flour-fine "bulldust" —a trap to the unwary motorist, whose comfort and temper are soon impaired by the inescapable grey powder that filters through every crack or crevice of his vehicle, saturating his hair, clothing and baggage. How fortunate we were to experience a green, almost dust-free land, after exceptionally good rains a few months previously.

Balladonia to Norseman

The gigantic boulders outcropping from the plain at Balladonia are a very welcome change after 730 miles of unrelieved limestone and sand since one last saw a rocky hill near Venus Bay on Eyre Peninsula. Granite slabs occupy some 20-30 acres against the old Balladonia Homestead, creating an effective catchment for rainwater that runs into a large and almost permanent pond near the south-west side. This precious water marked a former camping place for aborigines, who found game in the vicinity; indeed, long before them, in wetter Pleistocene times, it was the resort of extinct diprotodons, giant wombats and kangaroos, and even the Tasmanian thylacine whose bones have been unearthed from the shallow sand. Here is a veritable oasis of fascinating plant-life, that we were privileged to see at the most favourable season, and the brief half-hour allowed for a ramble there was far too short.

Excursionists swarmed over the big smooth rock-masses, photographing them from various angles. There were excited shouts as unusual flowers were discovered, and the first specimen of Sturt's Desert Pea to be seen in bloom caused a minor "rush". Some grovelled on the ground for close-up pictures of a fine colony of the little Adder's-tongue fern (*Ophioglossum coriaceum*). Nearby flourished excellent examples of the annual composite *Cuthonocephalus multiceps*, which the writer had discovered at this very spot in 1947 and had subsequently described as new to science; it is still not known from any other place, but similar outliers of granite would be worth examining at the appropriate season. This prostrate herb has yellowish-grey hairy foliage and numerous, button-like, creamy flower-heads with a curiously sweet aroma.

Other herbs of the moist rock selvages were yellow *Angianthus tomentosus*, purple *Glycine clandestina*, white *Anguillaria dioica* and *Helipterum corymbiflorum*, blue *Wahlenbergia* species and the moss-like crevice plant *Synaptantha tillaeacea*, while on wetter ground of drainage channels were extensive mats of *Glossostigma elatinoides* and *Crassula natans*, with minute mauve and pale pink flowers respectively. Small rock-pools abounded in the very active "shield-shrimp" (*Apus*), a tawny flattened creature almost 1 inch wide; some pools yielded a delicate species of water-milfoil (*Myriophyllum*) that cannot be matched at Melbourne Herbarium and may prove to be undescribed. Among larger, almost shrubby plants, the outstanding representatives were: *Lavatera plebeia* (Austral Hollyhock), *Hibiscus farre-*

***Clianthus formosus*, Sturt's Desert Pea.**

Photo: *late H. T. Reeves*

gei, *Solanum orbiculatum* and the introduced *Ricinus communis* (Castor-oil Plant). On saline ground, away from the granite, one was almost dazzled by the rosy-magenta carpets of *Disphyma australe* (Australian or Rounded Noon-flower).

Then away westward once more toward our evening objective, the Fraser Range. With a gradual change into undulating hills, sandier soils and a slightly higher rainfall, the mallee eucalypts become taller and the ground flora noticeably richer in species. At 23 miles short of the Fraser Range, progress was temporarily suspended by a road gang preparing to lay new bitumen; Eyre Highway had now been sealed right through to Norseman. While the bus waited half-an-hour for the "all clear" signal, its passengers marched ahead—an invariable procedure for walking parties, because time could never have been spared to drive back along the road and pick up stragglers in the rear. No stopping place could have been more propitious for the botanically inclined who discovered endless excitements in these roadside mallee woodlands. Eucalypts included *E. congloblata*, *E. flocktoniae*, *E. eremophila* and *E. salmonophloia*. There were *Acacia graffiana* and *A. merrallii* in heavy golden bloom, a spiny leafless bitter-pea (*Daviesia acanthoclona*), a tall inland form of sea-box (*Alyxia buxifolia*), *Solanum oldfieldii* with copious large violet flowers among its woolly crenulated leaves, silver-headed *Ptilotus holosericeus* and orange *P. carlsonii* (low herbs of the amaranthus clan), *Cryptandra leucopogon*, *Microcybe multiflora* and a host of other beautiful wildflowers.

Here was the land of emu-bushes, and five species were noted in almost as many minutes: cream-belled

Eremophila pachyphylla, rosy *E. alternifolia*, scarlet *E. decipiens*, pale blue *E. dempsteri* and deep blue *E. elachantha* (dwarf cushiony bushes less than 1 ft. high). A splendid lively specimen of the green and gold-striped *Euzostera mitchellii* was a special entomological prize—surely the aristocrat of all cockroaches.

Reluctantly we boarded our transport, but tumbled out again a few miles farther on at sight of a scarlet blaze beside the track—Sturt's Desert Pea in all its glory, and on the very crest of the Fraser Range, too! Runners from some robust plants measured yards in length and carried up to 9 nodes of the big lustrous flowers; *how* those cameras clicked, and in the general ferment one photographer left her spectacles against a clump of *Clianthus*—they were never retrieved.

The western foot of the range provided a good camp-site along a disused side road and close to a dam of fresh water. Tall eucalypts (*E. oleosa* var. *glauca* and the Goldfields Blackbutt, *E. le souefii*) gave shelter in a sylvan setting, and enough daylight still remained for a hasty survey of the ironstone slopes behind camp. Two outstanding semishrubs were *Scaevola oxyclona*, a blue fan-flower that forms dense prickly mounds reminiscent of porcupine grass, and *Heliotropium asperrimum* (a heliotrope with dense heads of white flowers that give out a deliciously sweet, spicy perfume). Other plants on the nearby range included the following: yellow *Pimelea thesioides*, *Dodonaea microzyga* smothered in papery red fruits, blue *Halgania cyanea*, *Microseris lanceolata* (yam daisy), gracefully weeping trees of *Pittosporum phillyreoides*, venerable she-oaks (*Casuarina huegeliana*) and two kinds of cloak-fern in the rock crevices (*Cheilanthes distans* and *C. lasiophylla*).

Those who elected to walk about the camp in bare feet suffered some discomfort from the all-too-abundant, sharply pointed burrs of *Emex australis* ("three-cornered jacks")—a weed that had invaded open sandy tracts. The hardest-worked camper must have been Mr. Alan Morrison. Long after others had put lights out, he struggled on with close-up photography of the multitudinous flowers gathered during the day and kept fresh in polythene bags. His only studio at Fraser Range was a grey-green sheet draped over a barbed-wire fence in the open, and his only illumination the campfire fed with brushwood.

Norseman, among its auriferous hills, is girdled with a maze of dried-out salt lakes where halophytic growths abound. Now supplied with water from the Mundaring Dam, 440 miles away, it is a pleasant oasis to which the Central Norseman Mine on Marroroa Hill has brought a revival of population and prosperity. Opportunities were taken to send messages home from the local Post Office, and we were intrigued by the number of aborigines about town. Some natives were not averse to being photographed for the sake of a florin or so.

Few trees near the settlement are more attractive than the indigenous Goldfields Blackbutt, its lean, straight and whitish boles wearing a black "stocking" of rough bark, to 3 or 4 ft. above ground. For miles the road to Esperance passes through groves of a ten-foot emu bush (*Eremophila interstans*). These graceful little trees had umbrella-like crowns thick with tiny cream flowers; from a distance, one instinctively likened them to an understory of pallid wattle blossom lightening the sombre forest. "Sombre" is hardly the right word here, since the bright green foliage of Gimlet Gums (*Eucalyptus salubris*) glisten and

sparkle in the sunlight, so high is the waxy gloss on each leaf surface. Their trunks vary in colour from bronze to near nigger-brown, and they gleam as if polished or newly wet by rain. Young stems are often attractively fluted, with a spiral twist that inspired the name "gimlet". Altogether, this eucalypt is one of the most elegant and decorative subjects in the whole Commonwealth; it certainly won unstinted admiration from every tree-conscious member of our party.

(To be continued)

The Naturalist and the Microscope

Sections of Sea-Urchin Spines

By D. E. McINNES

At the recent Nature Show hundreds of people saw and wondered at the beauty revealed when a slide of sections of sea-urchin spines was observed with dark-ground illumination under the F.N.C.V. microscope.

The slide was made by a member, Mr. E. Swarbreck, and is one of the most colourful slides of this type I have yet seen.

Many inquiries were made as to the method of making such a slide, so below is reprinted an article from the *Proceedings of the Microscopical Society of Victoria* 7 (Feb. 1947) by Mr B. Tindale. This may help members to make one of these attractive slides to add to their collection.

"The two most necessary things, if good successful slides are to be obtained, are, firstly, good quality shellac, and, secondly, the knowledge to know when to leave well enough alone.

Most failures are caused by a desire to get the sections too thin.

The necessary equipment consists of sea urchin spines, shellac, files, saws, camel brush, slips of fine deal about 8 x 1 x 3/16 inches a small clamp, water-stone of fine texture, glass slips cut from fairly heavy glass.

The spines must be washed in several changes of fresh water and dried, to remove salt and small particles of sand, etc.

The first step is to make a thick cement with some of the shellac dissolved in alcohol, and to melt the rest of the shellac on a tin hot-plate and with a knife work into sticks about the size of sealing wax.

The Sectioning Procedure

(1) Melt the shellac stick on to one of the boards to cover about 3 inches at one end with a thickness of about ¼ inch and flatten with a hot knife.

(2) When this has cooled a little, add a layer of the cement and on this set out the spines.

(3) Add another layer of melted shellac and flatten with a hot knife, then cement, and more spines.

(4) Repeat the procedure until the spines and shellac have been built into a dome-shaped mass about one inch high. Let this set thoroughly.

(5) Fix the clean end of the deal slip firmly to the table with the clamp and saw sections about 3/16 of an inch thick, taking the saw cut through

the shellac, right into the wood, and an old knife inserted into the cut will break the section off clean.

(6) Rub one side of the section on a worn file to remove saw marks, and then smooth with the stone until a good surface is obtained.

(7) Cement the smooth side to a glass slip with Canada balsam in turpentine and put away to dry thoroughly.

(8) The section is now filed down, using a finer file as the slide gets thinner. The water-stone is now used to take to the required thinness, examining frequently under 3X objective. Remember that the section will look clearer in balsam than air.

(9) The section, still cemented, is now soaked in methylated spirit until the shellac softens, when the spine sections can be lifted off with a camel-hair brush.

(10) The spines usually require two or three rinsings in spirit, followed by xylol and a final rinse in spirit before they are mounted in balsam."

Two extra tips from a member are to make sure that the thick cement is *thick*, if thin it takes too long to set, and, when sawing the shellac, to wet with water in order to prevent it from becoming warm and gumming up the saw.

Members in the country who are unable to obtain sea urchin spines can send a 5d. postage stamp and their address to D. E. McInnes, 129 Waverley Road, East Malvern, S.E.5, when sufficient spines to make a few slides will be posted to them.

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Excursion to Point Lonsdale

On 17th January, 1965, the writer led a Club excursion to the Point Lonsdale district. There was some confusion as to the rendezvous, but finally the party assembled at Mr Laker's shell-grit works, where semi-fossil shells are dug out of the soil (an old sea bed), washed and ground either to provide calcium for glass manufacture or shell-grit for poultry. The proprietor very kindly showed us round his workings, and explained his long-range plans to raise the level of part of the swampy land between Swan Bay and the salt lakes, and excavate the balance to form a navigable harbour and canals for small craft. The age of these deposits is approximately something over 5,000 years.

Lunch was then taken at Golightly Park, and the afternoon was spent examining the reef at Point Lonsdale. Sea anemones were common, and several sea urchins were also seen, but there were no very unusual discoveries.

Tea was taken at St. Leonards.

The party comprised the usual bus load of passengers, and several cars, including three from Point Lonsdale.

E. H. COGHILL

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